

FLIGHT

First Aero Weekly in the World.

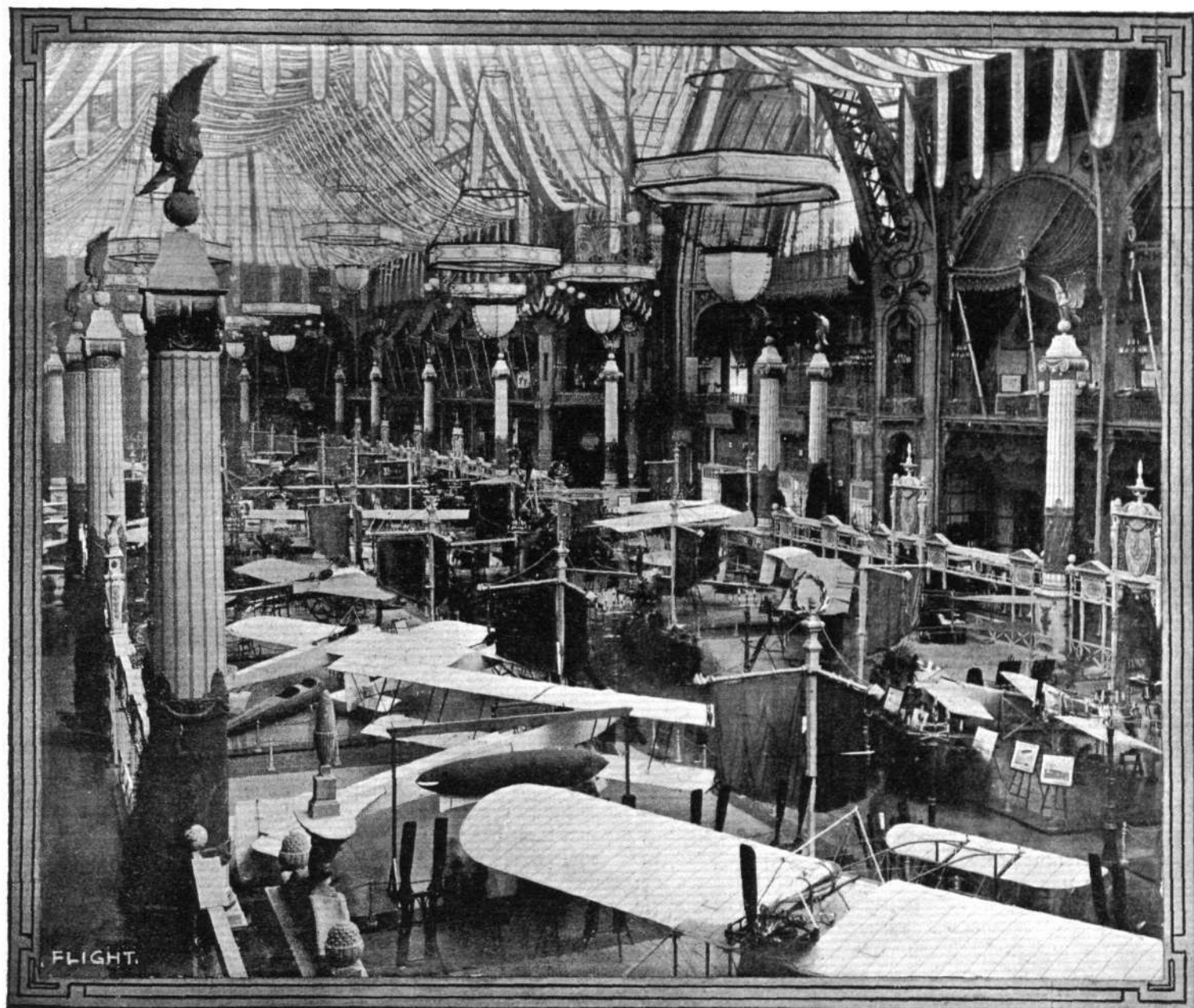
A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport.
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GENERAL VIEW OF THE THIRD PARIS AERO SALON.—The machine at the bottom of the photograph is the Bleriot 100-h.p. "Aeronef," built to the order of M. Henri Deutsch de la Meurthe. On the same side, but towards the centre of the Exhibition, may be seen the Zodiac biplane and the Borel and Deperdussin monoplanes, while opposite are the Train and H. Farman monoplanes and Savary and M. Farman biplanes.

EDITORIAL COMMENT.

The Government Aeroplane Trials.

At last the looked-for conditions of the aeroplane tests to be conducted next year by the War Office authorities have been issued, and without the least hesitation we say that they are parsimonious and unsatisfactory. Compared with what the French Government allocated for a similar purpose quite recently, the sum of money which figures in the way of prizes is paltry, and we do not for a single moment believe it will attract the manufacturers. Again, there is yet another reason why we do not think it will attract and that is because, if the conditions are carefully read, it will be seen that the authorities are not obliged, according to the text, to allot one single penny of this money in prizes, even though the machines entered, if any, pass the tests with all the *éclat* possible. We do not say or suggest that it is likely they would so far break faith with their implied obligations as to withhold prize-money which had been morally won, but in a test of the sort outlined in the official *communiqué* the element of business is paramount, so far as the manufacturer's point of view is concerned, and where he is invited to lay down plant and to otherwise spend his money in the effort to provide a machine capable of fulfilling the severe requirements of the War Office, he certainly has a right to know exactly where he stands. That is a matter which, however, the authorities can soon put right by an assurance that the prizes will in fact be awarded, whatever the result of the trials may be. It must be kept in mind that we are not dealing with something problematical. It is not as though the aeroplane had not proved itself to be a practical proposition. That it has done to the full, even supposing that we have not yet evolved the machine which is capable of fulfilling the War Office requirements in their entirety, a proposition we do not by any means admit, though it has to be recorded in this way.

Let us see how these tests compare as to the value of the money prizes offered with those of the French War Department. In the latter, £53,000 was the total sum offered, against £11,000 in our own case. The most successful manufacturer in the French trials received the handsome sum of £32,000, while under the British conditions the maximum amount that can be won is £5,000—about what it will cost the serious constructor to enter and take part in the trials. True, the War Office is prepared to purchase for £1,000—or rather, to take an option to purchase—any machine awarded a prize, a sum which is a little more than enough to cover the cost of such an engine as will ensure the machine passing the tests laid down! But just think of it, oil and petrol is to be supplied free for the tests. Prodigious!

Then, what has become of the suggestion that the War Office should give contingent orders for the machines it admits it will require? There is not a single word in the official conditions about the purchase of one machine, save the reference to the option we have already noted. The more one studies the official attitude towards the industry, the more unsatisfactory does it appear. It is admitted that aeroplanes are as much entitled to be classed as "ordnance" as guns for our battleships. Therefore, they must be built in this country—that is a prime essential. Now, there is hardly enough private trade in aeroplanes at the present moment to justify people in putting up large sums by way of capital to cope with the demand that exists or with the nebulous future requirements of a State department which does not yet know

its own mind. In consequence, it becomes absolutely necessary that an industry capable of coping with the demands of peace and war should be created and that can only be done with the assistance of the State. There is no blinking the fact at all—it is patent to everyone that we in this country cannot hope to create such an industry as is needed, unless the State, which is to ultimately benefit, will take a wise and prescient view of things and assist in the creation of that industry upon which our national existence may very well depend at some future date. There would have been no aeroplane industry in France to-day had the State not seen the possibilities and done the right thing at the right time.

Let us make another comparison. The French appropriation for next year's aerial programme is to be very nearly three-quarters of a million sterling. Germany intends to spend twice that amount in the very near future on the development of her aerial resources. We, the wealthiest nation on earth, are allotting a whole eleven thousand pounds to the furtherance of the movement towards our aerial supremacy! Here we have a Government which is literally wasting millions on vote-catching schemes of social reform, fiddling and flirting with wild-cat propaganda of all sorts, and there does not seem to be one single member of the Government or one of its responsible advisers who has the horse-sense to point out that the time has come when parsimony and vacillation must be discarded in favour of a really forward policy in aerial matters.

Hard on the heels of the issue of this magnificent prize scheme of the Government, comes the speech of Col. Seely—who, we fear, mainly reflects only his own personal sound|views—at the Royal United Service Institution last Monday evening, upon the occasion of the Aeronautical Society's resumed discussion upon the military Aeroplane. We had waited, he said, until there came a moment when we could wait no longer. In the opinion of the Government the time to move has now arrived, and he assured his audience that the Government proposed to attack the subject of aeroplanes with all the vigour they could—not only to make up lost ground, but to see to it that Britain should not be behind in this machine of warfare. And, he might have added, their idea of seriously attacking this pressing subject is by the offer of a paltry £11,000 in prizes to be competed for eight months hence! If the matter were not so vital, it would be positively humorous, but the pity of it is that there is no humour, save of the grimmest sort, in it at all. The more we study the present policy of the Government in its relation to the problem of our aerial supremacy, the less we seem to understand it. One day they blow hot, and the next cold. One day they are as prolific in promises for the future as they are chary of performance the next. We confess that the whole official attitude is, to our understanding, somewhat worse than the riddle of the Sphinx. Perhaps one day a modern *Œdipus* will reveal himself and puzzle it all out, and, we are inclined to add, we trust with the same consequences as the mythology tells us ensued upon the successful solution of the riddle—not to *Œdipus*, but to the Sphinx. But until that happens we are almost driven to think that there is no hope for the immediate future, and that we shall continue the policy of drift and muddling along that seems so characteristic of British officialdom. And, in the meantime, if war came to Europe —?

FLIGHT PIONEERS.



CAPTAIN J. D. B. FULTON, R.F.A.,

The first and, up to the present, the only British officer to secure the Special Flying Certificate of the Royal Aero Club, for which the tests consist of a 100-mile cross-country flight, a 1,000-ft. altitude flight, and a *vol plané*, with engine completely stopped, from 500 ft.

THE MILITARY AEROPLANE.

RESUMED DISCUSSION AT THE AERONAUTICAL SOCIETY.

ANTICIPATIONS of an interesting evening were more than fulfilled on Monday, December 18th, when the Aeronautical Society held their resumed discussion on the military aeroplane in the Theatre of the Royal United Service Institution, which, as Maj.-Gen. Ruck then said, was the first occasion on which military officers had discussed an armament problem *in public and under the ægis of a scientific society.*

Maj.-Gen. R. M. Ruck, C.B., took the chair, and the distinguished company present included Vice-Admiral H.S.H. Prince Louis of Battenberg, Col. Seely, Under-Secretary for War, Lt.-Gen. Sir A. Paget, Maj.-Gen. Sir C. F. Hadden, Brig.-Gen. Henderson, C.B., Col. J. E. Capper, C.B., Maj. Sir A. Bannerman, Commandant of the Air Battalion, Mr. Mervyn O'Gorman, Superintendent of the Army Air Craft Factory, and the principal Army officer pilots and most of the leading aeroplane designers and manufacturers.

The Chairman's opening remarks are given below, and especial reference is drawn thereto because of an important announcement made concerning a proposed memorial to Pilcher. Also General Ruck made an interesting suggestion concerning the formation of a committee to enquire into the cause and prevention of aeroplane accidents, which work he considered would be the finest memorial that could possibly be created to the memory of those who lost their lives in pioneering the conquest of the air.

In order that the many manufacturers present might be given the best possible opportunity of realising the nature of the work to be done by reconnaissance, Lt.-Gen. Sir A. Paget had given permission whereby Maj. Radcliffe, of the General Staff of the Eastern Command, was able to prepare a most admirable lecture in which he illustrated by means of maps two cases of actual warfare in which the possession of aeroplanes would have rendered invaluable service. Maj. Radcliffe's address is given below and it will be seen that from his own military point of view two types of reconnaissance aeroplane are essentially required.

The main question before the meeting so far as the manufacturer was concerned was, therefore, whether they, as manufacturers, could or could not provide the qualities of the two types specified by Maj. Radcliffe in one and the same machine. Opinion was strongly in favour of different machines for the two purposes, one a very fast scouting aeroplane in which high speed is everything, the other a machine in which the design is primarily directed towards making the machine better able to be used for detail reconnaissance and fighting. One constructive point of great importance in this connection is the position of the propeller, the opinion of Army officers being that they did not want the propeller in front on the destroyer aeroplane, which would be used for fighting, although its presence there on the high speed scout was not so great an objection. It was also the opinion of most of the manufacturers that the technical specification for the War Office prize aeroplane would produce a machine approximating to the destroyer class as evolved in the course of this discussion.

Among those who dealt with the constructive side of the question and whose remarks cannot be suitably reported for the reason that the proceedings were conducted from the Chair almost on the lines of a *viva voce* examination, were Capt. Wood, Mes-rs. W. O. Manning, H. Barber, F. Handley Page, T. W. K. Clarke, J. W. Dunne, Mervyn O'Gorman, Howard Flanders and J. C. Mort. Many military officers and pilots also participated in the discussion, and among those who spoke were Brig.-Gen. Henderson, C.B., Col. J. E. Capper, C.B., Lieut. Sampson, Capt. Burke, Capt. Ley and Mr. Barrington-Kennett. It was, in general, the opinion that a good pilot could be trained to bring back, unaided, reconnaissance information of the kind required from the use of the scouting aeroplane as defined in Maj. Radcliffe's lecture. Some doubt was expressed as to the ability of the pilot to remember the facts without taking notes, but it was generally agreed that he could see all he wanted to while piloting the machine.

After the termination of the discussion, H.S.H. Prince Louis of Battenberg rose to propose a vote of thanks to the Chairman and took the opportunity of expressing the interest that the Navy took in this question of aeroplanes for war, which had been discussed more particularly from the military standpoint at these meetings. "If the Army required a hawk," said Prince Louis, "then the Navy required a web-footed hawk capable of alighting and rising from the surface of the water."

Col. Seely, Under-Secretary of State for War, in seconding the vote of thanks, said that no one could possibly doubt that we were in the presence of a new and formidable science that would revolutionise warfare. Speaking on behalf of the Government, he said they agreed with a view put forward by Lord St. Aldwyn in the House of Lords the other day. We, as a nation, had always tended to wait in order to ascertain the best line in which to proceed. We had waited in the matter of aerial warfare, but there came a moment when we could wait no longer. In the opinion of the Government, that time had now come. They took a step forward recently, in which he had the honour to be associated with the Second Sea Lord of the Admiralty (H.S.H. Prince Louis of Battenberg), and he assured the audience that the Government proposed to attack this subject with all possible vigour, not only to make up lost ground but to ensure that Britain should not be behind; in this especially the Army and Navy would work hand in hand.

Maj.-Gen. R. M. RUCK, C.B. (Chairman):—

Before proceeding with the discussion I have been asked by the Council to make a statement concerning a proposed memorial to Pilcher, who is known to every student of aeronautics as the originator of "gliding" in this country, and who was unfortunately killed whilst practising in the grounds of Stanford Hall, the seat of Lord Bray. It is Lord Bray's desire to erect a memorial on the spot, but at present the subscriptions fall short by £25 of what is required.

Considering the very prominent part which Pilcher took in the proceedings of the Aeronautical Society, the Council would have wished to defray this amount from the funds of the Society, but they regret that this is impossible, hence they must appeal to the generosity of individual members. I have therefore to state that subscriptions are being received by the Secretary at the Society Headquarters, 53, Victoria Street.

Time does not admit to-night of my enlarging upon the great value of Pilcher's work, which is so well recorded in one of the pamphlets of the "Aeronautical Classics," but in connection with the ever to be regretted termination of his career there are a few observations, accompanied by a suggestion, which I venture, with the consent of the Council, to submit.

All who have the interest of aviation at heart must at some time or another have some qualms of conscience or at any rate they must feel a deep sense of regret associated with the loss of so many valuable lives during the progress of aviation. This must necessarily be so to a certain extent; the conquest of the air will claim its victims, but the question arises—are we doing our utmost to minimise our losses? It may be argued that safety is so important a consideration that existing dangers will eventually disappear.

This may be so, but in the meantime are we to sit still awaiting development? It seems to me that the defect of our present position is that there is no single existing organisation that can deal with this question of safety in a sufficiently comprehensive and thorough manner. My suggestion is that a small committee be appointed whose sole object should be to secure more safety for aviators, that its members should not necessarily belong to this

Society or to the Royal Aero Club, but that they should work under the ægis of both these associations, on terms to be settled between them.

I am aware that a portion of this ground has already been covered and that the Royal Aero Club has collected much information that would, no doubt, be extremely useful to a committee, such as I suggest, consisting of men of knowledge, men of experience and, above all, men who are heart and soul in the work, and who would naturally expect the cordial assistance of all those connected with aviation.

Certain part of the work of this committee would be to analyse all past accidents and to investigate all future accidents. I can well realise how difficult an apparently simple programme like this would be effectively to carry out, nevertheless, I do not think difficulties, however great, should be allowed to stand in the way of such good work and I feel confident that such a committee could surely find a means of overcoming any obstacle.

I cannot help thinking, moreover, that once started under favourable auspices there would be many who would come forward to assist "this Humane Society of the Air," and what could be a more fitting tribute to the gallant men who have lost their lives, or one more in accordance with their own wishes than the endowment of such a scheme, which would also have the merit, and I feel thus most strongly, of clearing our own conscience in that we would have done all we could to minimize the dangers of flying.

I do not invite discussion on this suggestion at the present meeting, but ask that you should think it over and discuss it either in the Press or by letter to the Secretary.

We now proceed with our discussion. Some of us thought after our last meeting that although some of the officers who had carefully thought over the subject had expressed their views as to the general employment of aeroplanes for scouting purposes, it would be advisable to obtain as authoritative an opinion as possible in this matter. With this object in view, and by permission of General Sir Arthur Paget, Major Radcliffe, of the General Staff of the Eastern Command, has kindly agreed to give us this evening the views held by himself and certain other officers of the General Staff who have

helped him in this matter. The opinions expressed are not, of course, official, but I can assure you that they are entitled to the greatest respect.

Since our previous meeting, the War Office have published their conditions under which their prizes will be given next year. You will remember that our last discussion was conducted on the under-

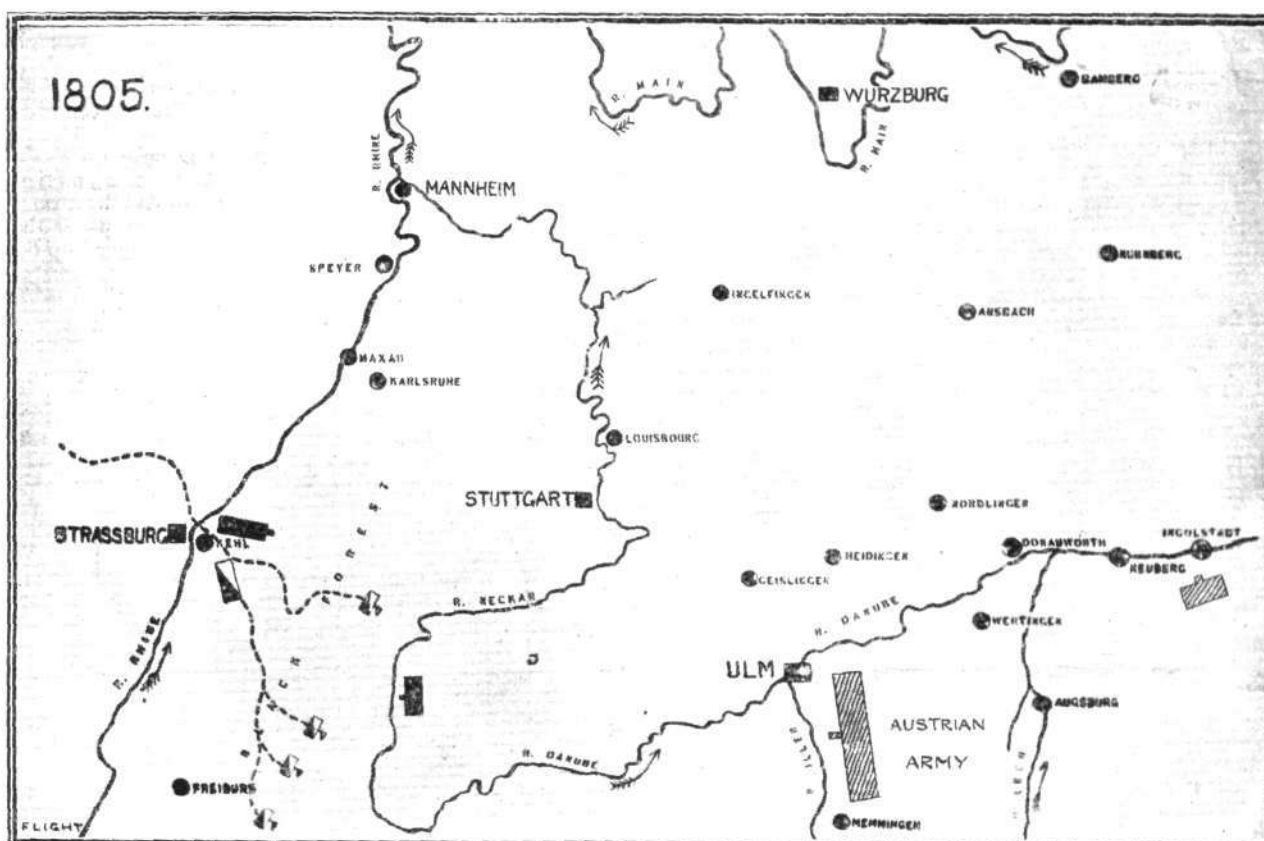


Diagram 1.—Map of the country, showing the disposition of the troops as the General of the Austrian army imagined it to be.

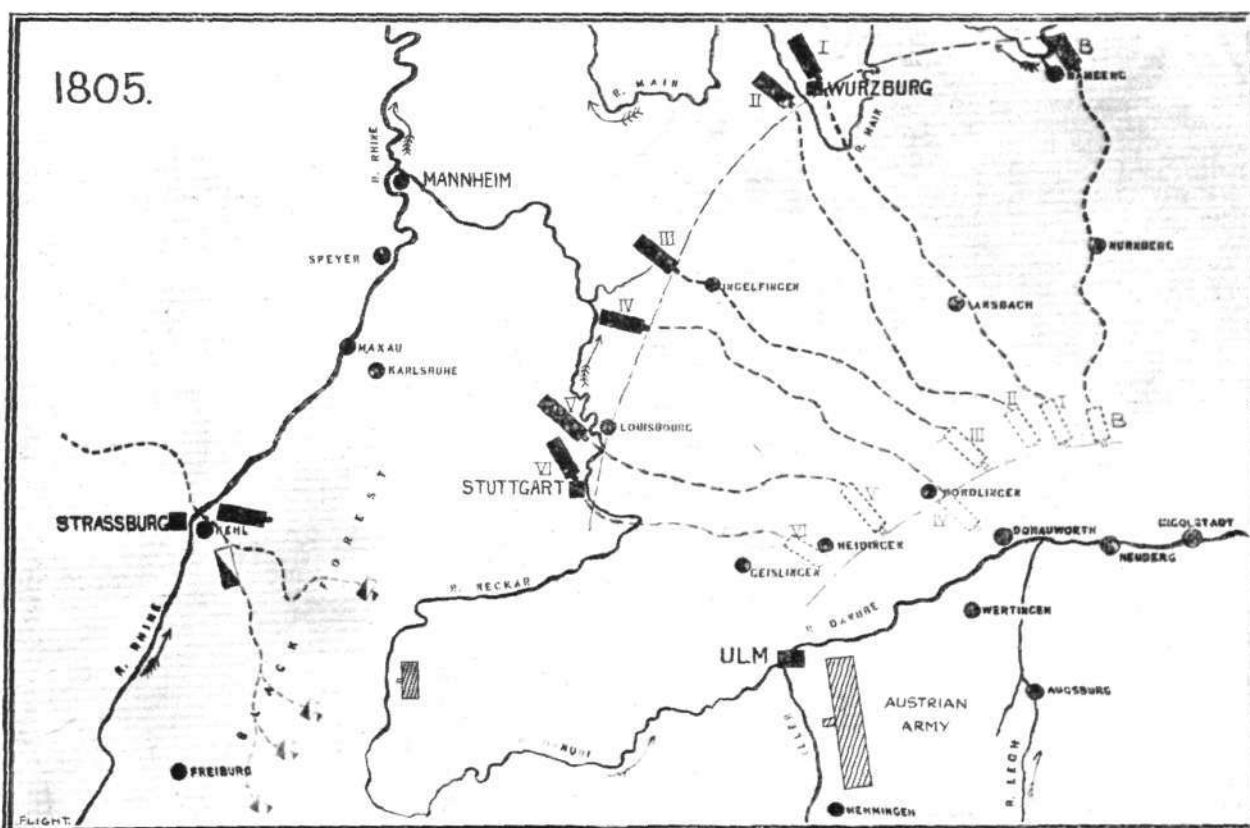


Diagram 2.—Map of the country, showing the disposition of the troops as they would have been disclosed to the pilot of a scouting aeroplane. The real advance of the French army was taking place from the north, as indicated by the black blocks and dotted lines, which show the route. The Austrian General was only aware of the smaller army advancing through the Black Forest from Strassburg.

standing that no reference was to be made to any question of policy of the War Office, which rule was most loyally adhered to by all speakers, and must still hold good. This does not mean, however, that all technical references to the prize conditions need be avoided, in fact, any information that would indicate the general lines an aeroplane must assume to satisfy War Office prize conditions is welcome.

I will now call on Major Radcliffe to give his lecture.

REQUIREMENTS OF THE MILITARY AEROPLANE.

MAJOR RADCLIFFE:—

Introduction.—In the presence of so many distinguished officers far more qualified than I am to give an opinion, it is with the greatest diffidence that I venture to address you. But, having had the privilege of attending the last meeting of the society here, and hearing what was said then, I have been asked to continue the discussion from the military point of view. Here let me say at once that I am speaking entirely in a private capacity, having no claim to express official opinions, consequently I will ask you to take what I have to say as just the views of the military "man in the street."

The Work Required.—Colonel Capper told us last time what the general requirements of the military aeroplane were. Then Mr. Archibald Low put before us very vividly the perplexities with which the designer finds himself faced when he tries to meet all the demands made on him by the soldiers, which seemed to include everything from an aneroid to an armour plate.

It is obvious, therefore, that we soldiers must limit our demands to what is really vital. To do this we must go back to first principles and define the work we want an aeroplane to do. It will then be for the designers, the makers and the pilots to say what type or what different types of machine are required to do the work.

Now the work we want done is, first and foremost, reconnaissance, that is, to obtain and to bring back information about the enemy. Although, as we shall see later, it may sometimes be necessary in the air, just as it is on land or on the sea, to fight in order to get this information, the fighting will only be a means to the end, and whatever developments may be possible in the future, it is to-day primarily as a scout, not as an instrument of destruction, that we regard the aeroplane.

The scouting we want done falls into two classes:

- i. Long distance, or strategical reconnaissance.
- ii. Close quarter, or tactical reconnaissance.

The conditions for each class present considerable differences and I will try to make these clear by one or two examples of what has actually happened in war.

Strategical Reconnaissance.—In illustration of Class i, I will ask you to fly back with me in imagination to the memorable year of 1805—just before Trafalgar. During that summer Napoleon had intended to invade England, and assembled a vast army near Boulogne for that purpose. Thanks to Nelson he had to abandon that scheme, and at the end of August he broke up his camp at Boulogne and marched right across Europe to attack the other States of the Coalition—Austria and Russia.

I will now ask you to look at Diagram I, which is a rough enlargement of the area shown by the large white patch on the map of Europe. It represents the country between the Rhine, the Danube, and the Main. Distances from Ulm:—Strasbourg, 105 miles; Heidelberg, 90 miles; Wurzburg, 98 miles; Bamberg, 115 miles; Stuttgart, 45 miles; Nuremberg, 90 miles.

The block, A, represents the Austrian army, 80,000 strong, under Mack; the blocks, F, are the French troops. The dotted lines show the routes followed by the various bodies of troops. The diagram shows the situation at the end of September.

Mack, the Austrian General, was waiting for his allies, the Russians, to come up from the east, and was comfortably established behind the River Iller with his right flank on the fortress of Ulm and a detachment about Ingolstadt, observing the small Bavarian force that had decamped to the north when the Austrians invaded Bavaria. He was expecting the French to advance through the Black Forest and, sure enough, the Austrian advanced troops encountered various columns of the enemy coming through all the defiles, with infantry in support. So, naturally enough, he concentrated his attention and his available means of a reconnaissance, that is to say his cavalry, in that direction.

We will now, in imagination, make a present to Mack of a serviceable aeroplane or two and see what they might have done for him. He would naturally have directed them towards Strasbourg and the Rhine in the first instance, but would also have told one or two to take a trip round by Stuttgart, say, or Wurzburg.

Well, these aeroplanes would have discovered a state of affairs that is represented by Diagram II—Napoleon and 200,000 men making straight for the Austrian flank and line of communications, and not coming through the Black Forest at all. The movements

reported there were simply a blind cleverly put up by the French Cavalry under Murat, and especially designed by Napoleon to deceive Mack.

Up to October 2nd Mack had no knowledge whatever of the movement of the French army from the North. Between the 2nd and the 6th, by which date the French were almost upon him, and, as indicated by the dotted lines, he gradually became aware of his danger, and at the last moment tried to change front and face north along the Danube. But he was too late.

The French columns swept across the Danube on the 6th, 7th and 8th; wheeled right-handed round to the west, cutting off the Austrians from their line of retreat through Augsburg on Vienna, and finally, with the exception of a detachment under the Archduke Ferdinand, that broke out to the north, rounded up the whole army in Ulm, which surrendered on the 17th October.

I have taken this particular campaign because, in addition to giving us a dramatic example of what reconnaissance, or the want of it, means, it presents several features that we may expect to find recurring in a war to-day.

The strategical deployment on a wide front; the advance in numerous columns, converging towards the area in which the enemy is known to be operating, with the object of enveloping one or both flanks; the rapidity, secrecy and inflexible resolution with which the movements are carried out and the leader's will imposed on the enemy, all these are salient characteristics of the policy favoured by one great school of military thought on the Continent to-day.

It is true that such marches as this one of Napoleon's, from the Straits of Dover to the Danube (over 400 miles), have been rendered unnecessary by railway transport; still, you must get your troops out of the train and properly formed up before you can get within striking distance of the enemy. Therefore, the approach march from the concentration area in which you detain has still to be done by road.

The detrainings stations that the enemy are likely to employ are usually known, more or less, in peace-time, and these detrainings stations give a valuable clue to the direction in which our strategical reconnaissance must be pushed.

Now let us see what the essential requirements of this strategical reconnaissance are:—

In the first place it is obvious that we want to get as early information of the enemy as possible, in order to make our little arrangements. For instance, Mack might reasonably have expected his airmen to make good the country up as far as Heidelberg and Nuremberg. This means a radius of action for the aeroplane of at least 100 miles.

In the second place, both in order to get there and back with the news in the shortest possible time and in order to escape interference from the enemy, we must have speed. Provided you can give me something that can beat anything the enemy has got in the way of speed, I am prepared to gamble on that and dispense, for this particular class of reconnaissance, with any other means of defence.

Thirdly, my chances of escape will be much improved if you can give me a silent machine.

Two things then I must have for this class of reconnaissance, viz.:—

- i. Wide range of action; ii. speed, and, if possible, silence as well.

Now, as to what we can do without.

This class of reconnaissance starts from and returns to a more or less comfortable home with every facility for rising, landing, repair and adjustment. Therefore a very heavy landing chassis would not seem necessary, and the whole machine may be lightly constructed.

Then again, no very great detail in the reports is necessary at this stage. You will see that the French army was advancing on a very wide front. During the critical period—2nd to 6th October—practically every main road in this zone would have been covered with troops and transport to a depth of 20 or 30 miles. It would be the same to-day. A Continental army corps, on one road, takes fully 30 miles, including its ammunition columns and baggage trains.

If at this stage of the proceedings a commander can be told the approximate frontage and depth of the zone in which the roads are covered with the enemy's troops and the direction of his march, that information alone will be of the highest value to him, even without any details as to what the different columns are composed of.

I can conceive it possible for this particular class of reconnaissance to dispense, at a pinch, with a special observer, on the assumption that the pilot alone, with a certain amount of experience in that line, could make the necessary observations.

For strategical reconnaissance then, what we must have is wide range of action, speed and, if possible, silence. To get this we are prepared to sacrifice everything else and throw overboard guns, ammunition, armour plates, and, if necessary, even the separate observer—though one would like to have kept him if possible.

Tactical Reconnaissance.—Turning now to the second class of

reconnaissance, which we want immediately before, during, and after a battle, we find the conditions very different. We have not

got to go so far to get the information, but we want that information in very much more detail. There is nothing, in fact, about the

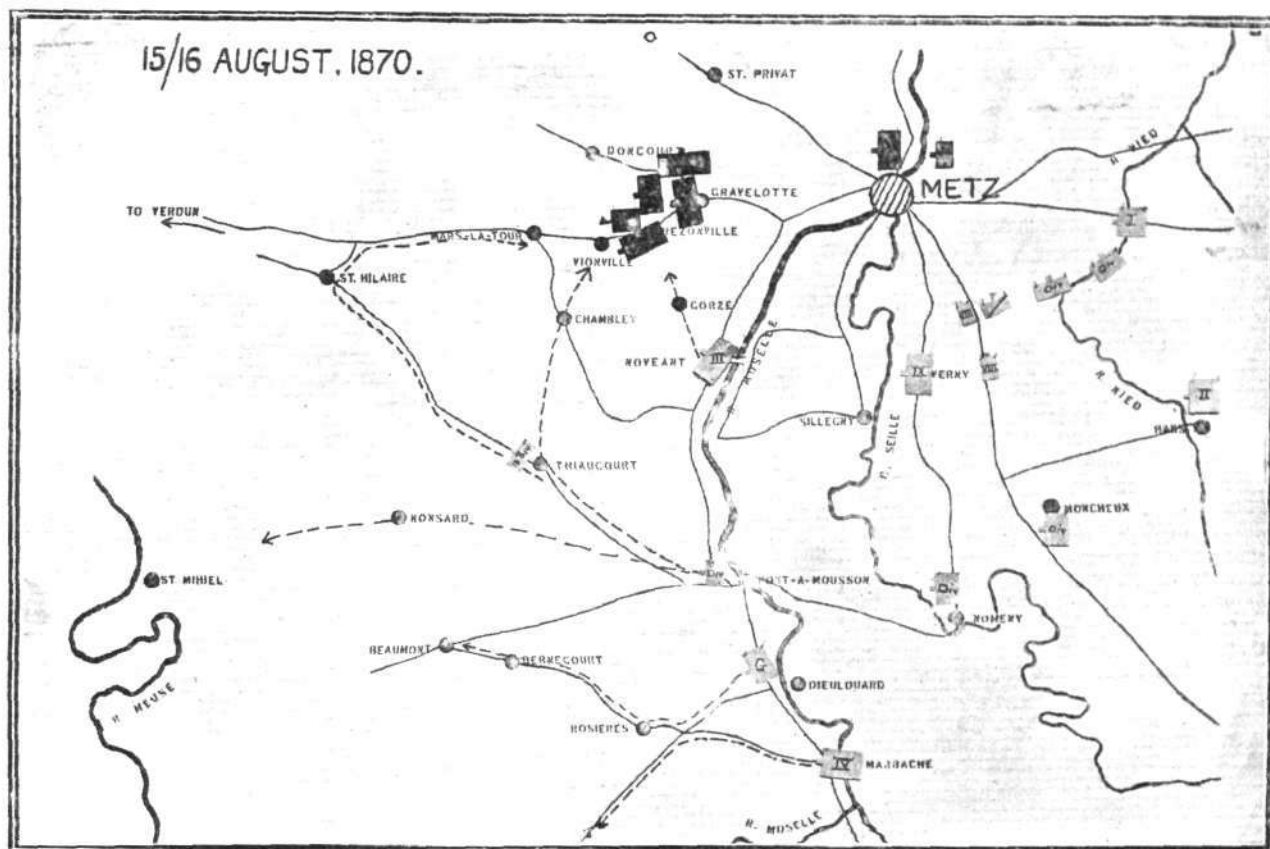
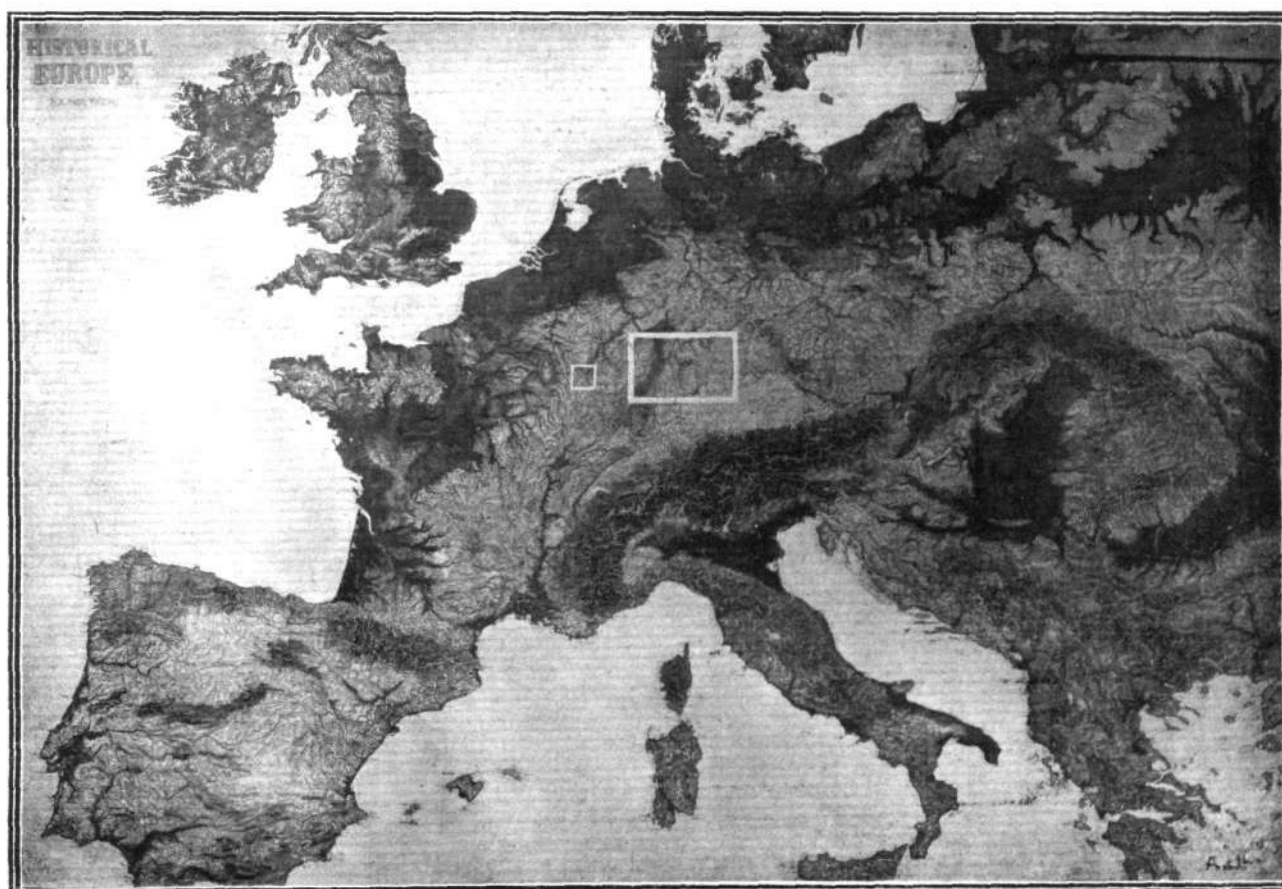


Diagram 3.—Map showing the disposition of the forces round Metz, on August 15th and 16th, 1870, giving an illustration of how an aeroplane designed for detail reconnaissance would have prevented the mistakes that were made on that occasion.



Map showing the areas covered by the diagrams. The large square refers to Diagrams 1 and 2, the small square to Diagram 3.

enemy's dispositions that we can afford not to know. In the first place, it is vital to know what force of the enemy is immediately in front of you, what reinforcements he has within reach and how long it will take him to get them up.

A very striking instance of what risks were run on one side, and what chances were missed on the other through ignorance in this respect is afforded by the battle of Rezonville—August 16th, 1870—which diagram III is intended to illustrate. It is, of all the battles of the Franco-Prussian War, to my mind the most interesting as a psychological study of personality and the way in which different leaders are affected when confronted with that common enemy of all commanders, the unknown.

Time will not permit to go into the details as closely as I should like to do, but the salient facts are these: On the evening of August 15th neither side knew what the other was doing, though they had fought a battle east of Metz the day before and had been in touch more or less since. Thus, on the morning of the 16th, the Germans thought the French had left Metz and retired west by the Verdun road and roads north of it. Consequently they sent their right army in a N.W. direction towards the Metz-Verdun road (about Rezonville and Vionville by Gorze and St. Hilaire by Thiaucourt) in order to harass what they thought would be only a rearguard. They directed their left wing due west towards the Meuse in order to head off the French or that river.

The consequence of this was that the German right wing ran into the jaws, not of a rearguard, but of the whole French Army, and from 9 o'clock in the morning till 4 o'clock in the afternoon a single German Army Corps—the III—had to contend, unaided and far from support, against 4 to 5 times its numbers.

At 4 p.m. the 20th Division from Thiaucourt, via Chambley, reached Vionville. The 16th Division and 3 regiments of IX came up on the right via Gorze. At 5 p.m. the 19th Division, from St. Hilaire, reached Mars la Tour, after a forced march of 25 miles.

You can see the risk they ran of being annihilated. But the French Commander, Bazaine, when surprised in his camps round Vionville by the German Horse Artillery in the morning, thought the whole German army was upon him—across his line of retreat—and in consequence, hesitated to leave the shelter of the fortress of Metz. Still further deceived by the German General's vigorous and sustained attacks, he remained on the defensive all day, and so missed a priceless opportunity of inflicting a crushing blow on his opponent.

It requires no effort of imagination to appreciate the value of aerial reconnaissance on such an occasion—which is a particularly valuable one to study, as it is an instance of what is called the "encounter battle." That is to say, not a set piece, in which one side occupies a clearly defined position, and the other side attacks it in due form, after careful preparation, but where both sides run into each other more or less simultaneously.

When both sides are animated with the offensive spirit, as are the great military powers of to-day, this type of battle is a highly probable result. It is one that makes most demands on a leader—necessitating the faculty of rapid decision, and inflexible determination.

In such a situation, therefore, the value of accurate and timely information is priceless.

Secondly we want detailed and accurate reports of the strength and accurate reports of the strength and dispositions of the forces with which we are actually in contact. Are they acting on the

defensive or preparing to attack? Where are their flanks? Where are their supports and reserves? His cavalry, infantry, and guns?

Specially do we want detailed and accurate information about the guns, for nowadays artillery can fire with great effect from behind the crest of a hill, where you cannot see them, and of all the disagreeable things in war one of the most unpleasant is to be shot at by guns that you cannot see, and therefore cannot shoot back at.

For this particular work of locating concealed guns aerial reconnaissance has possibilities beyond any other means at our disposal. In course of time we shall no doubt get our airmen to help in observing our own fire.

For this closer and more detailed reconnaissance more time will be wanted, and I think it will be admitted that a skilled military observer will be essential, which means a passenger in addition to the pilot.

Then we shall have to reckon on active interference from the enemy, who certainly will not allow our men to hover over him and give away his dispositions, as long as he has got any aircraft of his own to drive ours away, and as long as you can keep 3,000 or 4,000 feet up, I should be prepared to take the risk of damage from guns or rifles on the ground. But against the hostile aircraft I think some sort of protection is required, and we must also have some means of driving off or destroying the hostile machines to prevent our own dispositions being disclosed.

At first sight it would almost seem that we want some sort of armour as well as a weapon, but I heard enough at our last meeting to be sure that we cannot have both. In the Service, we are brought up to believe that with regard to hard knocks in general, and bullets in particular, "it is more blessed to give than to receive." Therefore, we will scrap the armour, and use the weight for some sort of gun and ammunition.

Without going any further I think it must be clear to everyone that for this close-quarter work our machine must have great weight-carrying capacity and stability to enable detailed observations to be made and the weapon to be used with effect.

It must also be strongly constructed especially as regards the landing chassis—for on the battlefield there will be no home comforts or facilities as in the case of the long-distance reconnaissance.

On the other hand here we do not want extreme speed; a limited radius of action will suffice; even one hour in the air would enable most valuable results to be obtained, silence becomes a secondary consideration.

Summary of all requirements.—At last we have arrived at what the general attributes of one aeroplane must be if it is to do all the work that a commander will ask of it.

On the one hand—extreme range and speed, on the other—great weight-carrying capacity, stability and strength.

If you can give us a machine that will combine all these attributes in one, we soldiers shall be only too pleased, for in war organisation the less we have to specialise the better.

The question for decision.—This, therefore, is the question I will put to the members of the Aeronautical Society:—

Can you produce a single type of aeroplane that will fulfil all these requirements, or is it necessary to specialise, on the one hand for range and speed, and on the other for weight-carrying capacity and stability of the kind that would be necessary for the detail reconnaissance work and fighting that I have outlined in the second case?

The "Wellcome" Photographic Diary.

THERE are quite a large number of aviation enthusiasts who also count photography among their hobbies. To such the "Wellcome" photographic exposure record and diary, 1912, should prove almost invaluable. It is really astonishing, until one remembers that it is published by Messrs. Burroughs, Wellcome and Co., of tabloid fame, how much really good information has been got into this little book, and withal there is ample space left for diary and exposure notes. It is really of a handy size and does not take up a lot of room in the pocket—a most important point. The book is provided with pencil and clasp, so that it does double duty as a pocket note-book and work of reference, and is equally useful in the dark-room and the field. The book also includes an excellent exposure calculator, which by the single turn of a disc shows the correct exposure under all circumstances. Three separate editions are published, especially adapted for the northern hemisphere and tropics, the southern hemisphere and tropics, and the United States, and those purchasing the book for a present should take care to specify which edition is required. The book may be obtained from all photographic dealers and booksellers, and at the railway book-stalls, the price being 1s.

Flying and Some of its Mysteries.

THIS is the latest addition to the "Playbooks of Science," a series of little volumes issued by Henry Frowde and Hodder and Stoughton, in which the author's aim is always the same: to provide boys with intelligent amusement in the course of which they will bring into play qualities that will serve them well in matters of greater importance. We should not be surprised to hear that the most popular one of them is that bearing the above title, which has been written by Mr. V. E. Johnson, M.A. The author knows his subject as well as anyone and he also knows his audience. We feel sure that any boy finding this book in his stocking at Christmas will value it more than most and not rest content until he has again and again read through it and run the whole gamut of the experiments described. The book is divided into three parts, the first dealing with model balloons and dirigibles, the second with kites, and the third with model aeroplanes, and in each case the reader will find full and clear instructions to enable him to build the various models. The book is well illustrated by a large number of useful sketches, and has for a frontispiece a picture of Professor Langley's steam model. It is published by Messrs. Henry Frowde and Hodder and Stoughton, at the price of 1s. 6d.

A Study of Bird Flight

By Dr. E.H. Hankin, M.A. DSc.
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CHAPTER XLI.—Changes of Camber of the Wing of Flying Foxes during Flight.

IN the preceding chapter I pointed out that a particular angle of incidence is appropriate to a particular amount of camber. For instance, if the angle of incidence is diminished while the camber is maintained, then there is loss of speed, as seen both in metacarpal descent and in ordinary steering by dip movements. If, on the other hand, the angle of incidence is diminished, and, if at the same time, the camber is proportionately diminished, then there is increased speed, as seen in flex-gliding and in shoulder descent. I have now to describe facts that show that flying foxes make a similar use of changes of camber.

When describing the anatomy of the wing of flying foxes (Chapter XXXI), I made the following statement:—

"There is a muscle that can rotate downwards or turn downwards the middle third of the anterior margin of the wing. This is the part of the anterior margin that is supported by the first two digits, and that extends in front of the main bony framework. By the turning downwards of the front margin of the wing the camber may be increased."

As the thumb supports this anterior part of the wing membrane (see Fig. 75) and extends beyond it, it is obvious that observations of the position of the thumb during flight might give a clue to changes of camber that in themselves are invisible. Such observations are very difficult to make, both owing to the speed of the bat and owing to the dimness of the light. The presence of the full moon is no advantage, as it seems to make the bats start later than usual. Causing them to fly by throwing stones during the day results in hurried flight of no use for my purpose. It rarely

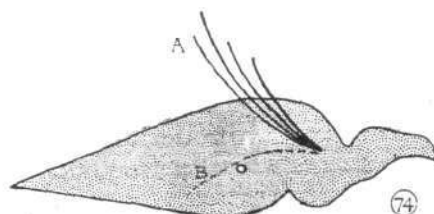


Fig. 74.—Diagram showing position of phalangeal quills in fast flex-gliding. A shows the actual observed position of the quills. At B is shown the position that these quills would take up in the absence of air pressure.

happens that a flying fox, when gliding, remains near enough to observe for so long as a second. At the time that the majority of the flying foxes start on their evening flight it is too dark to see any traces of the thumbs. But some minutes before their time of departure a few individuals flap or glide from one tree to another. With practice and by careful observation, glimpses may sometimes be had of the position of the thumb in these cases. But these observations are so difficult that I doubt whether increased acquaintance on my part with flying foxes would add appreciably to the knowledge of their flight that I have already gained.

My earlier observations are as follows:—

September 22nd, 1910.—A flying fox flapping downwards at a small angle with the horizon seemed to have the thumbs turned downwards.

September 23rd, 1910.—When gliding downwards with wings dihedrally down, or arched, or both, the thumbs appear to be pointing downwards. When flying upwards the thumbs appear to stick out straight in front (*i.e.* camber at minimum or abolished). In horizontal flapping flight they appear to stick out straight in front with very slight inclination downwards.

September 24th, 1910.—In steering (in the horizontal plane), I formed the impression that, besides arching the inside wing, the thumb of this wing is also turned down.

Having no clear idea of the meaning of these facts, I made no mention of them when writing the earlier chapter dealing with flying foxes. Some recent observations throw further light on the matter.

September 24th, 1911.—A flying fox seen to increase arching and flexing of wings for rapid descent. The result was that besides gliding ahead, it was noticeably dropping through the air. This was carpal and elbow flexing. No flexing occurred at the shoulder joint, because there was no rotation round the transverse axis. It was equivalent of carpal descent.

Another flying fox seen gliding downwards with wings strongly flexed and arched. Its thumbs were pointing downwards. This was shortly afterwards seen in another case. A flying fox gliding with wings arched seen to steer by increase of arching of inside wing. Thumbs were again seen pointing downwards in carpal descent.

September 25th, 1911.—In several cases, I saw that in flapping flight the thumbs are directed horizontally forward. In these cases the animal was flying either horizontally or at a slight upward angle with the horizon.

When gliding with wings slightly arched, and with no appreciable loss of height, the thumbs are directed forward with a very slight downward inclination. This was again seen.

When gliding with small loss of height, the thumbs are directed downwards and forwards.

That is to say, when flying foxes are gliding horizontally the camber is at a minimum. When arched gliding with slight loss of

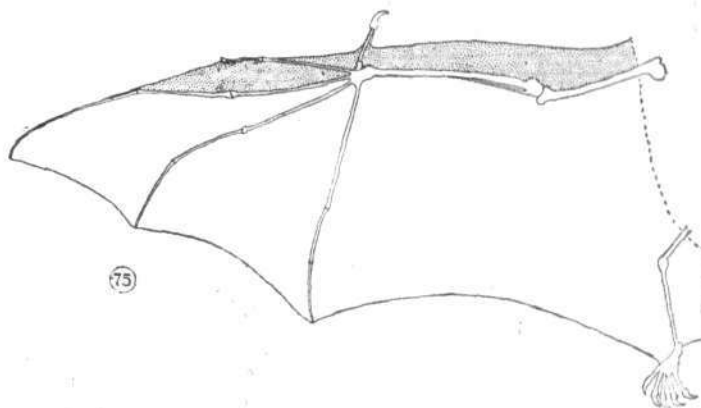


Fig. 75.—Outline of wing of flying fox. The shaded area shows the part of the wing membrane that is turned down to produce camber. The turning down affects chiefly the part of the wing membrane included between Digits I and III.

height, there is medium camber. When gliding downwards steeply—certainly without increase of speed, and probably with loss of speed—the camber is at a maximum. Previous observations have shown that in this latter case the angle of incidence is diminished. Hence it appears probable that we again have a case of checking speed by giving the wings a degree of camber unsuited to the angle of incidence.

Further observations show that flying foxes make another use of change of camber:—

September 29th, 1911.—A flying fox gliding upwards had thumbs horizontal.

September 30th, 1911.—A flying fox gliding downwards had thumbs pointing downwards. A flying fox gliding horizontally had thumbs very slightly inclined downwards. When gliding just before perching they pointed strongly downwards. Another also showed thumbs directed downwards just before perching. Another gliding horizontally showed thumbs directed forward nearly horizontally. A flying fox gliding showed thumbs pointed downwards just before poise flapping before perching. A flying fox making half flaps had thumbs directed horizontally forward.

October 2nd, 1911.—A flying fox gliding horizontally seen to turn thumbs downwards to check speed. A flying fox gliding had thumbs directed slightly downwards. Then, to check speed just before perching, the thumbs were turned strongly downwards.

Then it began poise flapping and perched. This again seen three times. Thumbs seen turned slightly downwards for flapping at low speed. Flexing and increased arching of inside wing seen for steering in flapping flight.

October 4th, 1911.—Thumbs seen stretched out horizontally in horizontal flapping flight. This seen again repeatedly. A flying fox gliding downwards with wings arched had thumbs turned down. A flying fox gliding seen to increase arching of inside wing for steering. A flying fox in flapping flight seen to steer by increasing the arching during the down stroke of the inside wing.

October 5th, 1911.—A flying fox seen to direct thumbs downwards in gliding just before perching. A flying fox in flapping flight seen to direct thumbs downwards just before perching.

These observations prove that in gliding before perching there is an increase of camber. But at this time the wings are advanced. This advancing produces rotation round the transverse axis, and the angle of incidence is consequently increased. Therefore, unless the movement is purposeless, it appears probable that in this case increased camber prevents dropping through the air or has some other beneficial action when speed is checked by the large increase of the angles of incident.

Parenthetically, I may state that during this period before perching (whether flapping or gliding) the hind legs come apart. No doubt this is due to the effect of the pull on the wing membrane caused by advancing the wings. In ordinary flight the hind legs lie parallel and close together.

From the above observations, it appears probable that arching to a large extent, is necessarily associated with turning down of the thumbs. In the human hand the thumb and first finger can be rotated downwards to a slight extent (supposing the hand is held palm downwards) without the movement of the middle finger. But rotation downwards of the thumb and first finger to a large extent causes a downward movement of the middle finger. The facts described suggest that the same relations hold in the case of the digits of the flying fox.

The use of change of camber seems to be the same whether the animal is flapping or gliding. I have previously shown that steering in flapping flight is caused by increase of arching of the inside wing during the down stroke. It is an interesting possibility that this increase of arching is a sign of momentary increase of camber. If this increase of camber exists it must coincide with a decrease of the angle of incidence, for the increase of arching is accompanied by a small amount of flexing, and, owing to the structure of the bat's wing, flexing at any joint must slacken the membrane and so diminish the angle of incidence. It will be at once objected to this view that we have no right to speak of an angle of incidence during flapping flight, but the force of this objection will be lessened by the following consideration:—

When an adjutant bird is observed in a gliding period of flapping flight, in end-on view, the wing-tip feathers are seen to be spread out like the wings of a fan, as illustrated in Fig. 23. That is to say, the wing-tip is rotated upwards in order to maintain the angle of incidence. This is always the case when there is effort to maintain or gain height. When gliding with loss of height, with or without arching of the wings, the wing-tip is rotated upwards to a lesser degree, so that the phalangeal quills lie nearly or quite in the same plane. Supposing the bird commences flapping, the wing-tip feathers remain spread out as before like the ribs of a fan. I have long suspected that they retain this disposition during the whole of the up stroke and during the whole of the down stroke. I have recently been able to see definitely that this is the case both in adjutants and in vultures when in ordinary flapping flight with effort to gain or maintain height. In a recent observation the degree of spreading out the wing-tip feathers appeared to be slightly less in flapping than in gliding with maintenance of height. My observations relate to birds observed flapping at low levels. It does not necessarily follow that the tip feathers are turned up when flapping at high levels when there is more effort to gain speed than height. The amount of retirement of the wing tips during flapping appears to be different under different conditions, but what these conditions are I have not yet been able to determine.

This turning up of the wing-tip feathers during flapping must be due to air pressure. At first sight it is difficult to understand how such pressure can cause this turning up during the up stroke. But it must be obvious that in gliding with effort to maintain height, the spreading out of the feathers is not due to air pressure from below, but to the air pressure due to there being speed ahead. That is to say it is due to air pressure from in front. When flapping, this pressure from in front must remain during the up stroke, and consequently the tip feathers can remain spread apart if the wing tip is kept rotated upwards. But if the pressure from in front acts thus in supporting the tip feathers, it must also act on the under surface of the wing generally. That is to say, during the up stroke the bird is still getting lift from the air in virtue of its speed ahead. Already

in Chapter XXX, I brought forward grounds for believing that flapping flight consists of gliding with flapping superadded. The considerations now brought forward support this conclusion.

But it does not follow that in all species of birds, or always in adjutants and vultures, that the wing-tip is kept rotated upwards during flapping flight. Two species of wading birds are known to me whose rate of beat is unusually slow, and in which flapping occurs with the wings arched throughout the stroke and with the wing tips flat. Also in these birds the up stroke terminates unusually early. That is to say, when the up stroke ends the wings have scarcely risen to the level of the back of the bird. These last two facts strongly suggest that, in these birds, flapping occurs with a smaller angle of incidence (so far as gliding is concerned) than is the case in the flapping flight of vultures and adjutants. But it is clear that in this point, as in many others, my observations only touch the fringe of knowledge that is readily accessible. The facts now brought forward suggest an interesting line of research, namely, as to whether there is some relation between loading, rate of beat, and the position of the wing-tips during flapping flight. Such a research might throw light on the fact that so many different species of birds have almost the same rate of beat.

Although my remarks on camber deal, not with new principles, but with new applications of principles already known, it is probable that further knowledge of this subject is attainable, and that it might be obtained in other ways than by observation of birds or bats.

For instance, it is possible that information might be obtained by experiments with a glider. For this purpose a biplane glider might be constructed having a means of adjusting independently the camber of the wings during flight. If, during a glide, the camber of the two wings of one side was increased, one would expect a steering effect towards that side to occur. Experiment would be necessary to find whether a means of altering the angle of incidence would be required in addition in order to produce this effect. One would expect that steering in the horizontal plane, thus produced, to cause less canting; that is to say, less drop of the wing whose speed is checked than would be caused by certain other methods of steering. Further, if the camber of both the wings of one of the planes was increased during a glide, one would expect rotation round the transverse axis to be produced. That is to say, if the camber of the wings of the upper plane was increased, one would expect the biplane to tend to glide upwards. If the camber of the wings of the lower plane was increased one would expect the glider to glide downwards. That is to say, one would expect these changes of camber to furnish a means of maintaining longitudinal stability.

Before leaving the subject of flying foxes, I will make a further quotation from my diary, omitted from previous extracts as it had no bearing on the preceding discussion.

September 24th, 1911.—Sun already set. A small thunder-storm to east. A puff of dusty wind moving branches. Flying foxes gliding to leeward of small trees broadside on to wind occasionally showed momentary flexing, as if as an "emergency adjustment" for dealing with wind irregularities.

An "emergency adjustment" can also be seen in the flight of vultures and other birds. If a vulture is startled by suddenly discovering the approach of another bird, or by a rifle bullet whizzing past it, it suddenly flexes its wings and lowers its legs. A relaxation of the secondary feathers may also be seen. That is to say, the vulture changes its flight to "carpal descent." By lowering the position of the centre of gravity, and by decreasing the supporting area of the wings, it thus turns itself into a sort of parachute. But, as already explained, the indisposition of the secondary quills in this form of descent is such as to permit of speed ahead rather than the irregular swaying of an actual parachute. As soon as the danger is past the bird expands its wings and resumes its flight. Twice, or perhaps three times, I have, as I think, seen this adjustment used for dealing with an atmospheric irregularity. Presumably if the bird was canted and the upper wing was struck by a gust of wind, the flexing would affect the upper wing first in order to hasten the return to a level keel.

Conclusion.

I have decided to interrupt at this point the publication of my papers on the flight of birds. An interlude is now desirable for two reasons. Firstly, time is required for me to find out in which directions my imperfect observations need extending and amplifying. Secondly, the greater number of the facts that I have discovered during the past year relate to subjects that I doubt whether I am yet competent to discuss.

The knowledge already gained is worth attention in that it appears to offer a means of research on certain obscure meteorological problems. There is reason for hoping that systematic study of soaring flight will lead to knowledge, perhaps not otherwise attainable, of the secret of the air, its store of energy, and its ceaseless change.

THE WAR OFFICE COMPETITION.

BELOW we give the full text of the competition and conditions that have to be fulfilled by machines competing for the War Office Prize, and without wishing to express an opinion that could only properly come from a manufacturer who has thoroughly digested all the technical details involved, we think we may say, without fear of contradiction, that the conditions are distinctly more onerous than those of the French trials. Not only will the competitions be difficult for those taking part, but it strikes us as likely that they may prove almost as difficult for the judges, for although the clauses sound straightforward enough in print, it is not always so easy to be sure of their execution in practice.

From the weight to be lifted and other factors, it is easy to see that the resultant type will be a fairly large machine, how large depends to some extent on whether the constructor chooses to lift his weight by flying fast with small wings or by flying comparatively slowly with a large area of sustaining surface. To fly fast and, at the same time to lift great weight, involves the use of a very powerful engine, which, at the moment, is somewhat difficult to obtain; consequently, it would seem likely that the English constructor, at all events, will be more inclined to aim at satisfying the minimum speed conditions, and even these may conceivably be deemed somewhat of a difficulty under the circumstances. Another factor that seems to be a governing clause is the specification of a minimum gliding angle of one in six. We have yet to hear that a high-speed weight-carrying monoplane comes anywhere near a gliding angle of one in six; and, for that matter, the successful biplane under this particular clause will come in for a full measure of our appreciation after the event.

The prizes to be awarded by the War Office on the recommendation of a Committee, which will judge the tests and will decide whether any machine submitted is to be subjected to any test.

A.—Prizes open to the world for aeroplanes made in any country—

1st prize ... £4,000 2nd prize ... £2,000

B.—Prizes open to British subjects for aeroplanes manufactured wholly in Great Britain, except the engines—

1st prize ... £1,500 Three 3rd prizes... £500 each
Two 2nd prizes £1,000 each

No competitor to take more than £5,000. The War Office to reserve the right to vary the proportions of totals under A and B between the various prizes if the merits of the machines warrant it, or to withhold any prize if there is no machine recommended for it by the Testing Committee.

The War Office to have the option of purchasing for £1,000 any machine awarded a prize.

The owners of 10 machines which are submitted to all the flying tests and are not awarded a prize to receive £100 for each machine so tested.

Oil and petrol to be supplied free for the tests.

The place of delivery of aeroplanes entered for the competition will be announced later.

The following conditions are those required to be fulfilled by a military aeroplane:—

1. Be delivered in a packing case suitable for transport by rail and not exceeding 32 ft. by 9 ft. by 9 ft. The case must be fitted with eyebolts to facilitate handling.

2. Carry a live load of 350 lb. in addition to its equipment of instruments, &c., with fuel and oil for 4½ hours.

3. Fly for three hours loaded as in Clause 2 and maintain an altitude of 4,500 ft. for one hour, the first 1,000 ft. being attained at

the rate of 200 ft. a minute, although a rate of rise of 300 ft. per minute is desirable.

4. Attain a speed of not less than 55 m.p.h. in a calm loaded as in Clause 2.

5. Plane down to ground in a calm from not more than 1,000 ft. with engine stopped, during which time a horizontal distance of not less than 6,000 ft. must be traversed before touching.

6. Rise without damage from long grass, clover, or harrowed land in 100 yards in a calm, loaded as in Clause 2.

7. Land without damage on any cultivated ground, including rough plough, in a calm, loaded as in Clause 2, and pull up within 75 yards of the point at which it first touches the ground when landing on smooth turf in a calm. It must be capable of being steered when running slowly on the ground.

8. Be capable of change from flying trim to road transport trim, and travel either on its own wheels or on a trolley on the road; width not to exceed 10 ft.

9. Provide accommodation for a pilot and observer, and the controls must be capable of use either by pilot or observer.

10. The pilot and observer's view of the country below them to front and flanks must be as open as possible, and they should be shielded from the wind, and able to communicate with one another.

11. All parts of aeroplane must be strictly interchangeable, like parts with one another and with spares from stock.

12. The maker shall accurately supply the following particulars, which will be verified by official test:

a. The h.p. and the speed given on the bench by the engine in a six hours' run.

b. The engine weight, complete (general arrangement drawing), and whether air or water cooled.

c. The intended flying speed.

d. The gliding angle.

e. Weight of entire machine.

f. Fuel consumption per hour at declared h.p.

g. Oil consumption per hour at declared h.p.

h. Capacity of tanks.

13. The engine must be capable of being started up by the pilot alone.

14. Other desirable attributes are:

a. Stand still with engine running without being held. Engine preferably capable of being started from on board.

b. Effective silencer fitted to engine.

c. Strain on pilot as small as possible.

d. Flexibility of speed; to allow of landings and observations being made at slow speeds if required, while reserving a high acceleration for work in strong winds.

e. Good glider, with a wide range of safe angles of descent, to allow of choice of landing places in case of engine failures.

f. It is desirable that the time and number of men required for the change from flying trim to road trim, or packed for transport by rail, and *vice versa*, should be small, and these will be considered in judging the machine. The time for changing from road trim and packed condition to flying trim to include up to the moment of leaving the ground in flight, allowance being made for difficulty in starting engine.

g. Stability and suitability for use in bad weather, and in a wind averaging 25 miles per hour 30 ft. from the ground without undue risk to the pilot. Stability in flight is of great importance.

h. The packing case for rail transport to be easily dismantled and assembled for use, and when dismantled should occupy a small space for storage.



The Law of the Air.

THIS little book, issued by the University of London Press, consists of the three lectures which were delivered by Mr. Harold B. Hazeltine, LL.D., some months ago in the University of London at the request of the Faculty of Laws. The first lecture deals with the fundamental problem, the rights of States in the air space; the second lecture bears on the subject of the Principles and Problems of National Law, while the concluding lecture is devoted to Principles and Problems of International Law. The book is a valuable one, as it is written by an authority on the matter, and besides setting forth his own ideas he has collated what has been thought and written by others. He points out that as early as 1793 there were discussions on questions of aerial law, and they continued at various intervals until the use of balloons in the Franco-Prussian War brought the subject into much greater prominence. It cannot be long now before many of these legal problems will have to be seriously tackled. The book is published at 5s. nett by Messrs. Hodder and Stoughton, for the University of London Press.

The New Art of Flying.

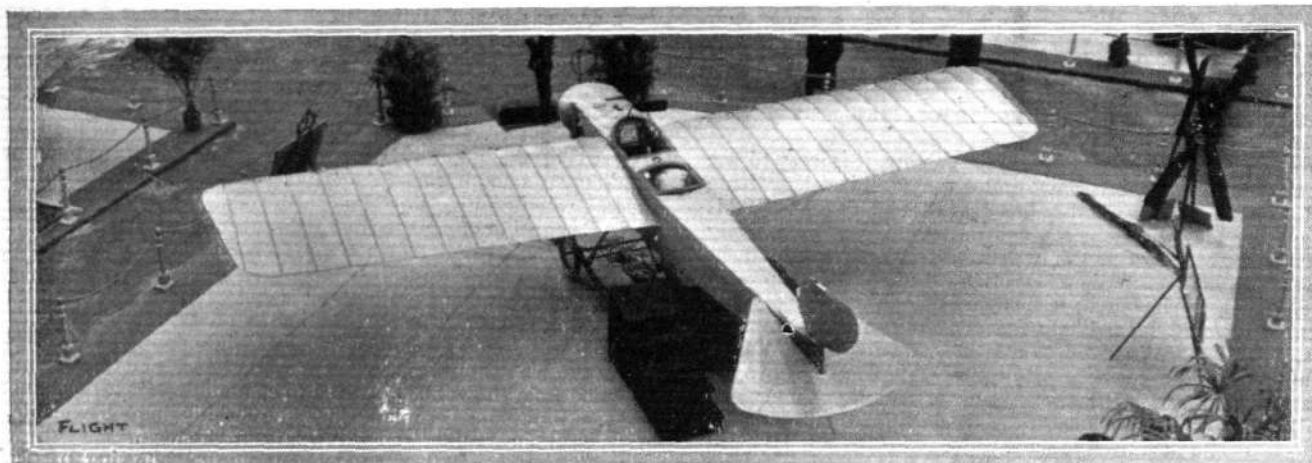
HERE is the romantic story of the development of the aeroplane told from the American point of view and in a way to suit the non-technical reader. The author, Mr. Waldemar Kaempffert, has evidently studied his subject well and is able to tell in an interesting manner the various things which those who take little more than a passing interest in aviation wish to know. One of the most interesting chapters in the book is that on the new science of the air for which Mr. C. F. Talmon, librarian of the United States Weather Bureau is responsible. It gives quite a lot of useful information regarding the structure and movement of the air ocean. There is also a chapter on the law of the air, in the preparation of which the aid of Prof. F. W. Aymar, of the New York University Law School, has been invoked. The book is well illustrated by a large number of photographic plates, while where necessary the text is elucidated with clear sketches or line drawings, and at the end is a very useful glossary. The book is published in England by Isaac Pitman and Son.

IMPRESSIONS AT THE THIRD PARIS AERO SALON.

THE scene in the interior of the Grand Palais on Friday, the 15th, the day preceding the official opening, was of the usual ante-show animation. A continual stream of lorries and vehicles of all descriptions flowed in from the goods entrance, and deposited their

Commissaire General and the Secretary of the Organising Committee of the Salon.

M. Fallières was followed by a suite consisting of M. Messimy, Minister for War; M. Caillaux, President of the Council; M.



The sole representative of Great Britain at the Paris Salon—the "Bristol" 50-h.p. military two-seater, constructed by the enterprising British and Colonial Aeroplane Co., Ltd.

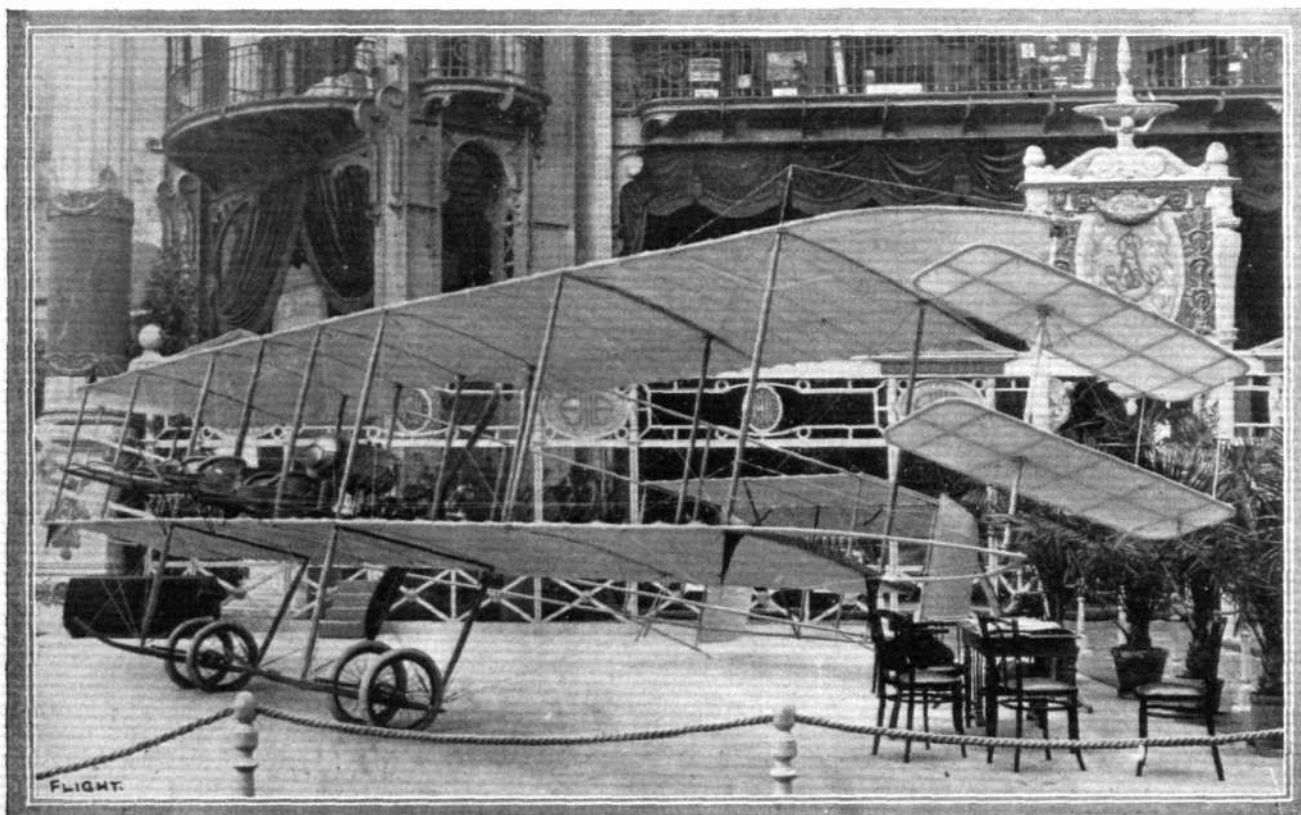
equally miscellaneous loads at the various stands. Almost every machine in the Salon was in a stage of semi-erection, and even as late as five o'clock in the afternoon a few of the exhibits had not yet arrived. Along the passages between the stands were deposited great heaps of fine gravel, waiting there for the heavy lorry traffic to cease before it could be properly spread out. How the Salon could ever possibly be ready by the following morning was the problem. Yet it was, and that at least two hours before the official opening by the President of the Republic, M. Fallières, at 9 o'clock. By then the stands were all in good order, the fresh covering of gravel had been laid on the paths, and flower beds had sprung up everywhere to relieve the monotony to the lay mind of wood, steel, and canvas.

Punctually at the ordained time, President Fallières drove up to the Salon in his landau, and was received at the main entrance by MM. Robert Esnault Pelterie and André Granet, respectively the

Augagneur, Director of Public Works; and M. Couyba, Minister of Commerce. The Military Authorities were further represented by General Roques, who directs Military Aviation in France; General Mannoury, Governor of Paris; Lieut.-Col. Bouttieaux; and Capt. Marconnet. Whereas the official opening took place as early as 9 o'clock in the morning, the general public were not admitted until 10 o'clock, thus allowing the worthy President to make the round of the stands in comfort. Such, however, was not the lot of less favoured ones who had not obtained possession of special admits for the opening.

Towards mid-day the crowds became denser, and, moreover, still continued to augment, until they assumed a density typical of the Olympia Motor Show on a busy day.

A peculiar feature about the mass of people that thronged through the Salon was that, seemingly, about 75 per cent. of them



The 50-h.p. Henry Farman biplane, equipped with the new Bronilawsky stabilising system of rotatable planes, shown on the Bronilawsky stand.

A Tabular Description of the Aeroplanes Exhibited at the Third Paris Aero Salon.

DECEMBER 23, 1911.

FLIGHT

Constructor.	Type.	Principal Dimensions.			Weight of			Construction.	Landing Gear.	Controlling Surfaces.		Type of Body.	Motor.			Propeller.	Price.
		Length.	Span.	Area.	Speed.	Machine.	Useful Load.			Lateral.	Longitudinal.		h.p. and Type.	No. of Cyls.	Position.		
Albatros ...	Biplane ...	10'40	13'30	40	90	420	300	Wood ...	W. & S.	Wa.	Rear elevator ...	Torpedo ...	100 Argus ...	4	Front	Albatros ...	24,000 marks
Astra ...	" ...	10'90	12'30	48	90	700	400	" ...	"	"	"	Triang. section ...	80 Chenu ...	6	"	Astra ...	28,000 francs
Aviatik ...	Monoplane ...	9'50	12'50	25	115	450	300	" ...	"	"	"	"	70 Aviatik ...	4	"	Chauvière ...	25,000 "
Blériot...	Do., Popular type	7'50	8'70	—	80	—	—	" ...	Wh.	"	"	Rect. section ...	30-35 Anzani ...	3 V-type	"	Normale ...	11,800 "
	Do., cross-country	7'65	8'90	15	95	240	200	" ...	"	"	"	"	50 Gnome ...	7	"	"	21,500 "
	Do., racer	6'50	7	12	125	240	130	" ...	"	"	"	"	50 " ...	7	"	"	24,000 "
	Do., two-seater ...	8'24	11	25	95	330	300	" ...	"	"	"	"	70 " ...	7	"	"	30,000 "
	Do., Aeronef ...	13'80	12'90	—	—	698	—	" ...	"	"	Front elevator	"	100 " ...	14	Rear	Normale ...	—
Borel ...	Monoplane ...	6'85	9'08	14	115	250	200	" ...	W. & S.	"	Rear elevator	Square section	50 " ...	7	Front	Chauvière ...	22,000 "
	Do., two-seater ..	8	12	20	95	270	300	" ...	"	"	"	"	70 " ...	7	"	"	25,500 "
Bristol ...	Do., two-seater ...	7	10'25	18'50	110	290	200	" ...	"	"	"	"	50 " ...	7	"	Bristol ...	23,750 "
Breguet	Double monoplane	9'10	13'60	33	95	625	400	Steel ...	"	"	"	Torpedo ...	100 " ...	14	"	Chauvière ...	45,000 "
	"	9'10	13'60	33	90	650	280	" ...	"	"	"	"	75 Chenu ...	6	"	Breguet ...	35,000 "
Caudron	Biplane ...	6'60	7'30	20	90	220	130	Wood ...	"	"	"	"	30-35 Anzani ...	3 Y-type	"	Normale ...	9,000 "
Clement-Bayard	"	9'80	11'05	28	90	400	250	Steel ...	"	"	"	Pent. section ...	50 Clement-Bayard	4	"	Regy Frères	28,000 "
Deperdussin	Monoplane (school type)	7'45	8'50	15	85	—	—	Wood ...	"	"	"	Square section	30-35 Anzani ...	3 Y-type	"	Rapid ...	11,500 "
	Do., military ...	7'50	8'50	24	110	250	250	" ...	"	"	"	"	50 Gnome ...	7	"	"	23,000 "
	Do., two-seater ...	8'00	10'00	28	110	420	300	" ...	"	"	"	"	70 " ...	7	"	"	27,000 "
	Do., three-seater	7'50	13'00	32	110	450	440	" ...	"	"	"	"	100 " ...	14	"	"	45,500 "
Farman (M.) ...	Biplane (staggered planes)	14	11	35	85	430	300	" ...	"	Ai.	Front and rear	—	70 Renault	8	Rear	—	25,000 "
Farman (H.) ...	Monoplane ...	7'50	10	15	105	285	180	" ...	"	"	Rear elevator	Square section	50 Gnome ...	7	Front	Chauvière ...	25,000 "
Goupy ...	Biplane ...	7'00	7'00	22	90	250	250	" ...	W. & S.	"	"	Rect. section ...	50 " ...	7	"	"	28,000 "
Kauffmann ...	Monoplane ...	7'50	10'50	14	140	260	150	" ...	"	Wa.	"	"	50-60 Anzani ...	—	"	Centrale	20,000 "
Loiré et Olivier	"	8'00	10'60	20	120	438	175	" ...	"	Ai.	"	"	60 " ...	—	"	Chauvière	20,000 "
Marçay-Moonen	"	12'00	13'50	20	90	45	150	Wood and steel	Wh.	Wa.	"	Skiff ...	50 Gnome ...	7	"	"	—
Morane-Saulnier	Do. (school type)	6'00	9'00	14	90	260	170	Wood ...	Wh. & S.	"	"	Rect. section ...	35 Anzani ...	—	"	"	17,000 "
	Do. (racer) ...	6'00	9'00	11	120	287	250	Wood and steel	Wh.	"	"	"	50 Gnome ...	7	"	"	23,000 "
	Do. (military two-seater)	6'00	9'00	14	102	312	375	Wood ...	W. & S.	"	"	"	50 " ...	7	"	"	24,000 "
Nieuport	Monoplane (school)	7'20	8'65	16	120	240	140	Wood and steel	"	"	Rear	"	28 Nieuport ...	2	"	"	18,000 "
	Do., two-seater ...	7'80	10'9	22'5	110	32	250	"	"	"	"	"	50 Gnome ...	7	"	"	26,000 "
Paulhan-Train	Monoplane ...	8'60	8'60	12'3	130	360	150	Wood ...	Wh.	N.	Rear elevator	Torpedo ...	50 " ...	7	Rear	Regy Frères	25,000 "
Ponche and Primard	"	8'50	9'70	20	75	300	100	Steel and alumin.	W. & S.	Wa.	"	Open triang. section	35 Labor Aviation	—	Front	Chauvière	16,000 "
R.E.P.	"	7'70	12	20	110	400	200	Steel ...	"	"	Rear elevator	Pent. section ...	60 R.E.P. ...	5	"	Regy Frères	30,000 francs (1-seater)
																	35,000 francs (2-seater)
Savary ...	Biplane ...	11	14	52	100	600	300	Wood ...	"	Ai.	Flexing tail	—	70 Labor Aviation	4	"	Chauvière (2) ...	26,000 francs
Sloan ...	"	9'50	13	49	95	508	300	"	"	"	Rear elevator	Square section	100 Gnome ...	14	"	Chauvière	35,000 "
Sommer	"	9	12	30	90	290	225	Steel ...	Wh.	Wa.	"	—	50 " ...	7	Rear	—	21,000 "
	Monoplane ...	6'70	8'70	16	108	260	200	Wood ...	"	"	"	Square section	50 " ...	7	Front	Chauvière	16,000 "
Train ...	"	8'30	9'30	16	85	260	150	Steel ...	W. & S.	"	"	Triang. section	50 " ...	7	"	"	22,000 "
Vinet ...	"	7'80	8'70	16	88	205	200	Wood ...	"	"	"	Rect. section ...	50 Anzani ...	5	"	"	18,000 "
	"	6'50	8'70	16	95	170	200	"	"	"	"	"	35 Bariquand & M.	4	"	"	11,000 "
Voisin ...	Biplane (Canard)	7'90	12	43	90	550	250	Wood and steel	H.	Ai.	Front	"	70 Gnome ...	7	Rear	"	30,000 "
Zodiac ...	Biplane ...	11'75	15	32	95	450	200	Wood ...	W. & S.	"	Rear	"	50 " ...	7	Front	Normale	28,000 "

W. & S. = wheels and skids.

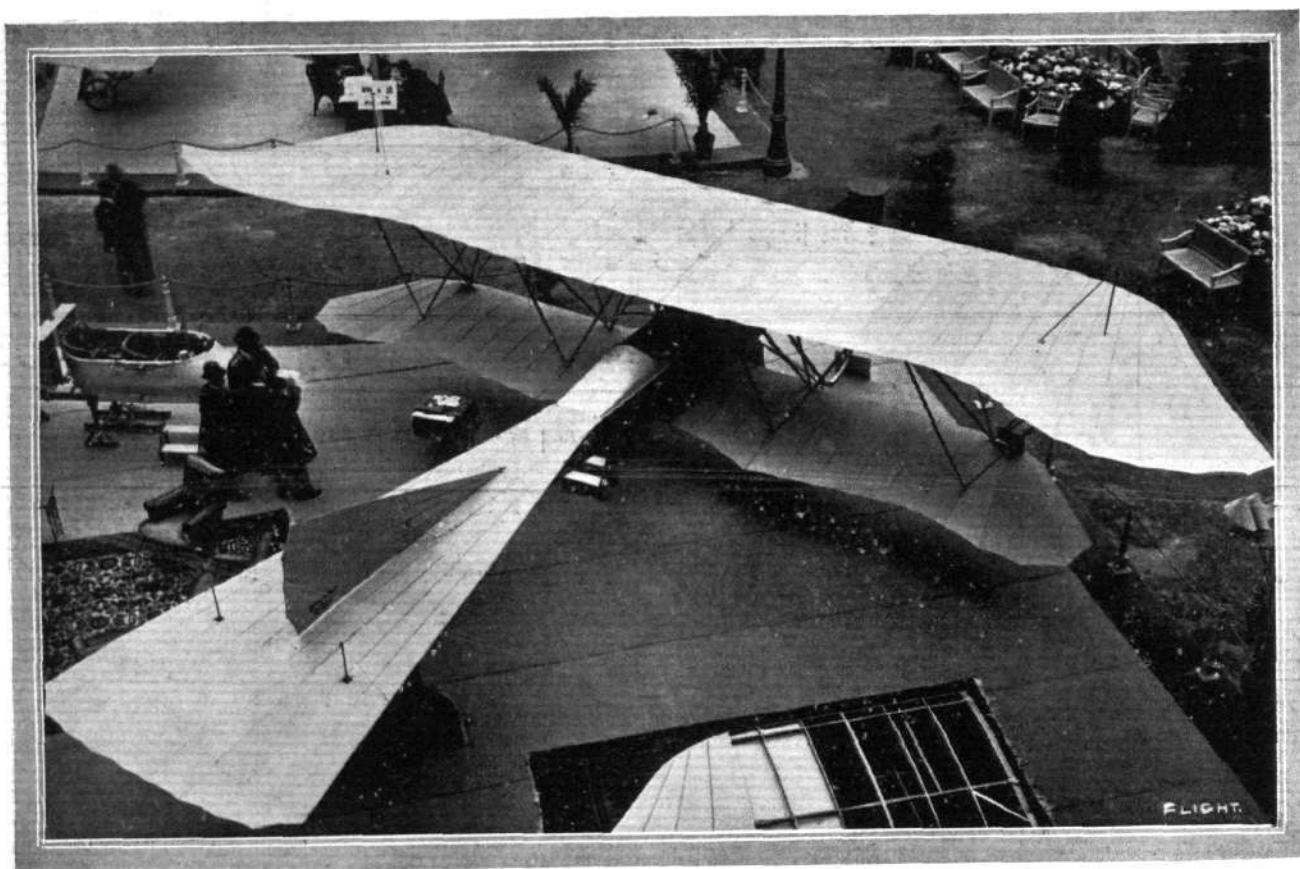
Wh. = wheels.

H. = hydroplanes.

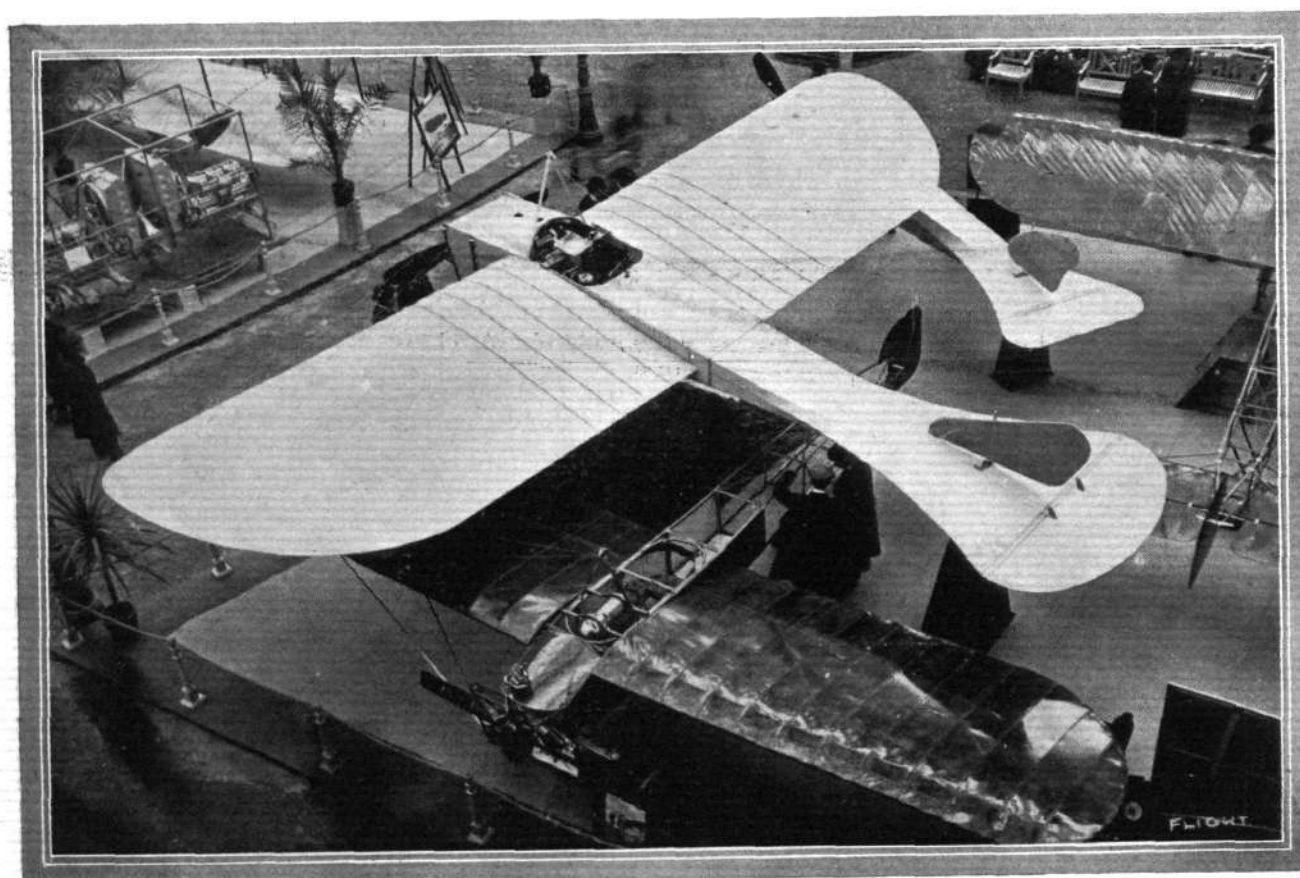
Wa. = warping.

Ai. = ailerons.

N. = normal.



One of the two German aeroplanes at the Salon—the Albatros biplane.



THE BLÉRIOT STAND.—At the bottom of the picture, with the varnished wings, is the new "Popular" type Blériot, fitted with a Y-type Anzani motor of 35-h.p. as listed at £380. The larger monoplane is the 70-h.p. military two-seater, while the tail half of a machine emerging from under the right wing of the two-seater belongs to the new 50-h.p. Racer.

Aero-motors Exhibited at the Third Paris Salon.

Make.	Nominal h.p.	No. of Cylinders.	Type and Disposition of Cylinders.	Cooling.	Dimensions.		Revs. per Minute.	Weight in Kilos.	Price in Francs.
					Bore.	Stroke.			
								kil.	frs.
Anzani ...	30	3	Fan ...	A	105	130	1,400	73	4,000
	35	3	Radial ...	"	105	130	1,400	55	4,300
	60	6	" ...	"	105	125	1,400	86	9,000
	80	6	" ...	"	115	140	1,400	115	12,000
	100	14	" ...	"	90	120	1,400	150	18,000
Aviatic ...	70	4	Vertical ...	W	124	130	1,300	115	7,000
	100	4	" ...	"	140	140	1,300	152	8,000
	150	4	" ...	"	155	165	1,300	160	10,000
Beck ...	35	4	Rotary ...	A	80	130	850	70	7,000
	50	4	" ...	"	110	130	850	80	9,000
	75	4	" ...	"	120	130	850	85	14,000
Burlat ...	35	8	" ...	"	95	120	1,200	85	6,500
	65	8	" ...	"	120	120	1,200	120	11,000
	130	16	" ...	"	120	120	1,200	230	22,000
Chenu ...	50	4	Vertical ...	W	110	190	1,800	115	9,500
	75	6	" ...	"	110	190	1,800	170	13,000
	200	6	" ...	"	150	200	1,800	390	25,000
Clem.-Bay	100	4	" ...	"	135	160	1,500	210	30,000
Clerget ...	50	4	" ...	"	110	120	1,500	78	10,000
	100	4	" ...	"	140	160	1,250	155	19,000
	200	8	" ...	"	140	160	1,275	220	32,000
Dansette-	35	4	Vertical ...	"	98	125	1,200	90	6,500
Gillett	50	4	" ...	"	105	160	1,200	110	8,000
	75	4	" ...	"	130	160	1,100	150	10,000
	100	6	" ...	"	130	160	1,100	250	20,000
	120	8	" ...	"	114	160	1,200	180	15,000
	200	6	Vertical ...	"	180	200	1,000	500	35,000
De Dion	100	8	V. ...	"	90	150	1,500	—	—
Favata ...	180	16	Radial ...	A	110	120	1,200	160	30,000
Gnome ...	50	7	Rotary ...	"	110	120	1,200	76	13,000
	70	7	" ...	"	130	120	1,300	83	16,000
	100	14	" ...	"	110	120	1,200	100	24,000
	140	14	" ...	"	130	120	1,200	130	30,000
Helium ...	45	3	Radial two-stroke	"	90	90	1,200	75	5,500
	60	3	"	"	100	100	1,200	90	6,500
	75	5	"	"	90	90	1,200	105	7,500
	100	5	"	"	100	100	1,200	145	10,000
	45	3	Rotary two-stroke...	"	90	90	1,200	70	8,000
	60	3	"	"	100	100	1,200	78	10,000
	100	5	"	"	100	100	1,200	125	15,000
	120	6	"	"	100	100	1,200	145	18,000
	200	10	"	"	100	100	1,200	230	27,000
Helium (degyroscopic)	120	6	Groups of three rotating in opposite direction	"	100	100	1,200	156	18,000
	200	10	Groups of five, ditto	"	100	100	1,200	250	27,000
Laviator	35	3	Rotary valveless ...	"	110	130	1,100	65	6,000
	50	6	"	"	100	130	1,100	75	9,000
	75	9	"	"	100	130	1,100	100	12,000
	100	12	"	"	100	130	1,100	130	16,000
Labor ...	70	4	Vertical ...	W	100	210	1,300	150	9,000
Ligez ...	—	3	Rotary ...	A	115	130	1,200	—	—
Nieuport	28	2	Horizontal opposed	"	130	150	1,200	68	5,000
Orlikon	60	4	"	W	100	200	1,200	80	—
Panhard	35	4	Vertical ...	"	110	140	1,100	105	8,000
	60	6	"	"	120	140	1,000	160	14,000
Renault ..	25	4	V. ...	A	120	90	900	100	5,000
	35	8	V. ...	"	110	70	900	110	8,500
	50	8	V. ...	"	120	90	900	170	10,500
	70	8	V. ...	"	—	—	900	180	12,000
	90	12	V. ...	"	140	96	900	290	17,000
R.E.P. ...	45	5	Fan ...	"	100	140	1,200	110	12,000
	60	5	"	"	110	160	1,200	150	14,000
	90	7	Radial ...	"	110	160	1,200	210	20,000
Ros. Peug.	40, 50	7	"	"	110	110	1,100	78	11,500
Salmson	60	7	Parallel cylinders...	"	75	260	1,300	100	10,000
	80	7	Radial ...	W	120	140	1,250	135	13,000
	110	9	"	"	120	140	1,300	160	18,000
Viale ...	30	3	Fan ...	A	105	130	1,250	75	4,500
	50	5	Radial ...	"	105	130	1,250	90	7,500
	70	7	"	"	105	130	1,250	115	10,500
	100	10	"	"	105	130	1,250	145	15,000

A = Air. W = Water.

were of the gentler sex. By five o'clock, every passage in the Grand Palais was nothing but a solid phalanx of humanity, and to get about visiting the stands independent of the general movement of the crowd was almost a sheer impossibility.

As was only natural to expect, most of the prominent French aviators were there.

On entering the Grand Palais one is immediately struck with the magnitude of the uniform decorative scheme. Under the central dome of the building is hung a huge light cloth bearing the monogram of the exhibition, and radiating on all sides are brightly coloured hangings, each stand having its double name banners. The scene at night with the lights full on is really magnificent.

As for the aeroplanes themselves they were particularly noticeable for the excellence of workmanship that was evident in their construction.

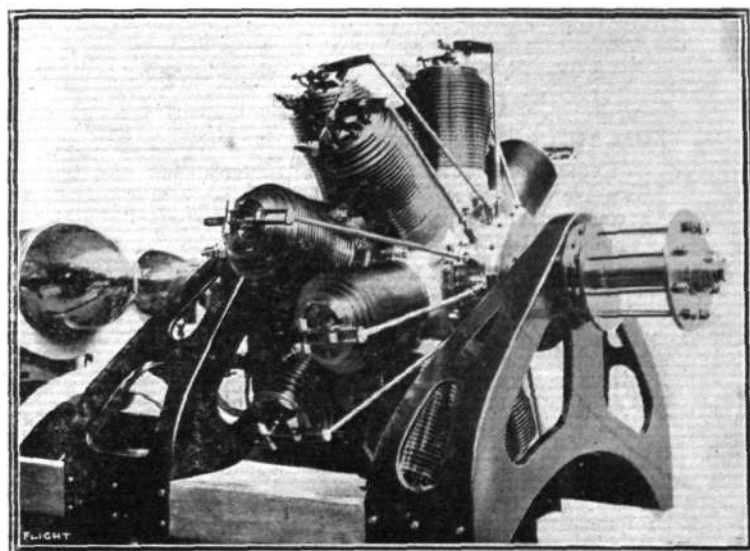
Monoplanes were more in preponderance than ever, there being 29 as opposed to the 14 biplanes on exhibition. Verily the monoplane seems to be heading its double-decked rival for we see Farman, Sommer, and even Paulhan, once three of the greatest adherents to the biplane type, exhibiting monoplanes.

With the biplanes, only four retain the disposition of the engine to the rear of the pilot, and these are the products of Maurice and Henry Farman, Roger Sommer, and Voisin. The remaining ten of the biplanes are of the engine-in-front type and consist of the machines of the following firms:—Albatroswerke, Astra, Breguet (2), Caudron, Clement Bayard, Goupy, Savary, Sloan, and Zodiac. It is interesting to notice the growing popularity of the fuselage as the central unit in the construction of biplanes. Of the 14 biplanes at the Salon, 9 incorporate the use of this feature in construction. These include the names of those firms mentioned above as representing the engine-in-front type of machine, with the exception of Savary and Caudron, and with the addition of Voisin, who is showing his *Canard*.

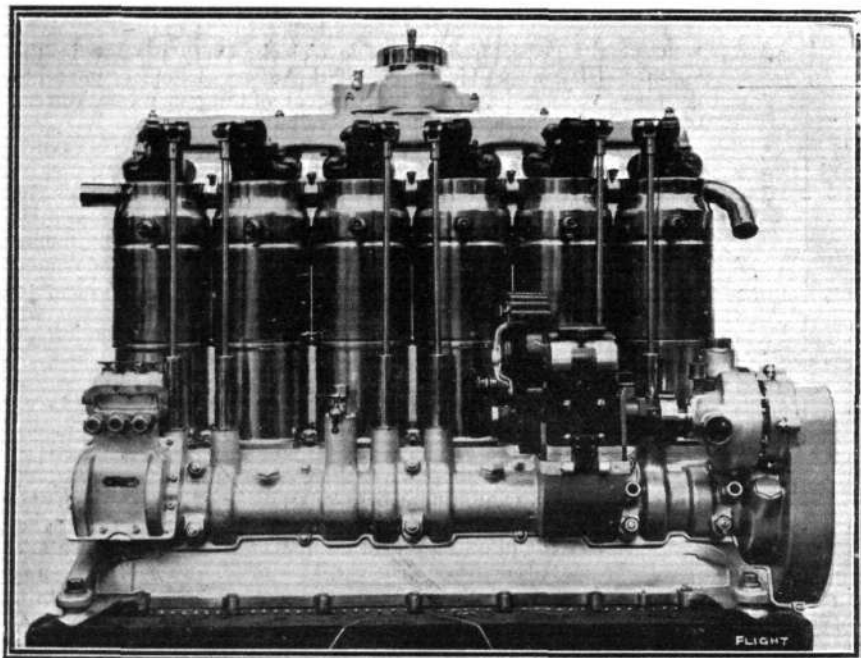
With reference to the form of the bodies themselves there is a decided tendency in favour of bodies of the torpedo type, a feature that was foretold in these pages two or three months ago. It is rather surprising that the advantages of this type, as concerns the reduction of head resistance, have not been seen before, but now that Tatin and Paulhan have jointly demonstrated that, using a body of approximately streamline form, and paying due attention to the subject of reduced head resistance, it is possible to attain speeds in the neighbourhood of 80 miles an hour, we may confidently expect this type to gain great popularity.

All-steel construction is also coming steadily into favour, eight machines now representing this type of construction, viz., Breguet, Clement Bayard, Morane-Saulnier, Ponche and Primard, R.E.P., Sommer, and Train. Of these seven, Sommer and the Morane-Saulnier combination have been converted to belief in the advantages of all-steel construction since the last Aero Salon in Paris. The Ponche and Primard monoplane is, with the exception of the main skids and propeller, constructed entirely of metal. Even the steel skeleton of the wings is metal-covered, sheet aluminium being employed. Steel, as is already known, plays a considerable part in the construction of both the Nieuport monoplane and the Voisin *Canard*.

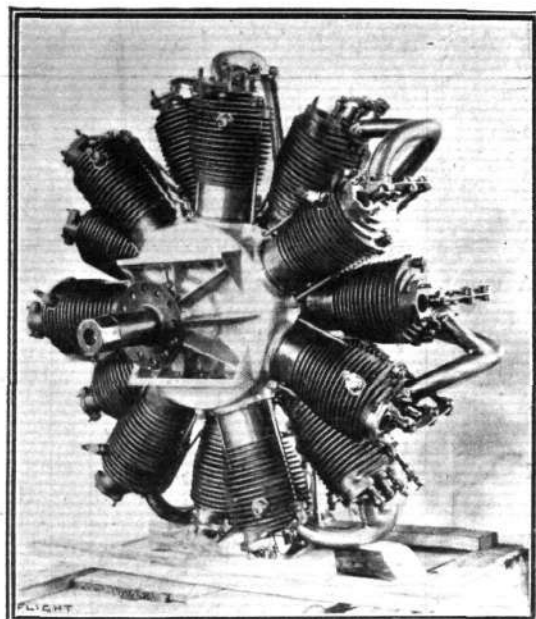
One very curious feature about the landing chassis of this year's machines is that, in those which may be classed as close copies of



The 14-cyl. 140-h.p. Gnome motor at the Paris Aero Salon.



The 6-cyl. 60-h.p. Panhard motor at the Paris Aero Salon.



The 14-cyl. 100-h.p. Anzani motor at the Paris Aero Salon.

the Henry Farman-type, the skids have grown much smaller in size, and have in some cases absolutely disappeared.

When one recalls to mind the length of the skids that Henry Farman used on his first chassis, the skids that he fits now appear ridiculously small. However, they are none the less effective in use, and certainly considerably lighter. Sommer, both on his monoplane and his biplane, has cut his skids away absolutely, so that their function is now merely as a base to which to attach the landing wheels. The same applies to the chassis of the business-like looking Morane-Saulnier warplane.

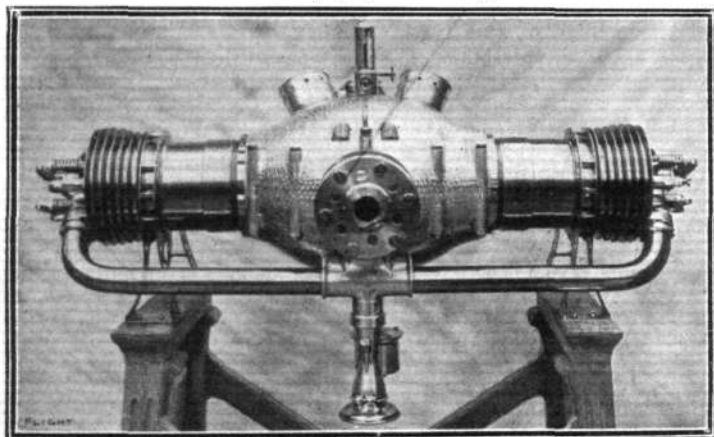
These changes make one wonder if the Farman skid ever did come into action as a skid.

Fabric varnish is extremely popular among the machines at the

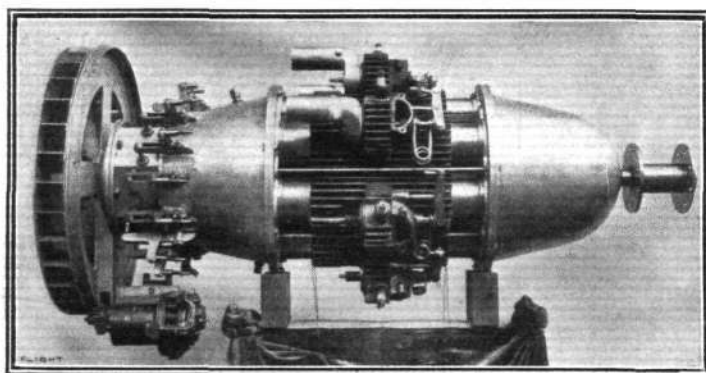
Salon, quite 75 per cent. of them being treated either with "Norovia" or "Emaillite," both of which preparations are equally as good as one another as far as can be ascertained.

Among the many aeroplanes on view at the Salon only three are not of French origin. These are the Albatros biplane, representing Germany, the Aviatik monoplane from Austria, and last, but not least, the 2-seater Bristol monoplane, representing Great Britain.

This latter machine was the centre of much very favourable discussion, on account of its pleasing lines, the excellent standard of workmanship in its construction, and more especially on account of the interest aroused by Valentine's daring flight across Paris, on the Thursday preceding the show, on an exact replica of the machine exhibited.



The 28-h.p. Nieuport motor at the Paris Aero Salon.



The 60-h.p. double 7-cyl. Salmson motor at the Paris Aero Salon.

Miss Lilian Bland Married.

EVERY reader of FLIGHT will be interested to learn that Miss Lilian Bland was recently married, and is leaving presently for Vancouver Island, where, by way of a change, she anticipates enlarging her education by the control of a motor boat. Her plucky pioneer work with her gliders and her aeroplane in Ireland, and particularly the frank, instructive, and often amusing letters that so enlivened our earlier correspondence pages, won for Miss Bland many unknown friends, and she will take with her into her new sphere of life many thousands of good wishes from our readers.

Also, there is a romance in the matter, which, as we have only just been let into the secret ourselves by a charming letter, we feel we have a right to share with others. FLIGHT, it appears, has been the match maker, for away in far distant Vancouver, the fortunate gentleman who is now Miss Bland's husband read of her perseverance and pluck and came to the conclusion that they must surely be indicative of just those qualities so essential to the pioneer settler in a place like Vancouver.

So he came over to see, and at length Miss Bland decided that

her aeroplane, engine and other effects relating thereto had better be laid aside.

"Miss Bland's" Engine and Machines.

As a consequence of the marriage of Miss Bland, we learn that she is disposing of her aeroplane, engine, propeller, plant, and machines. There is also the biplane itself, which only requires assembling to make an excellent glider. This Miss Bland is willing to pass on, for the cost of carriage and packing, to some club which is putting in practical work amongst its members. So that here is a chance for one of our energetic bodies to take up. Any communications in regard to the biplane, engine, propeller, &c., should be made to "Miss Bland," Carnmoney, Belfast, Ireland.

An Aerial Torpedo.

MR. A. D. WIGRAM, an Australian engineer, has invented an aerial torpedo from which great things are expected. It consists of an ordinary torpedo with a propeller in front, but it is equipped with small planes at each side as well as a fin underneath to help maintain lateral stability.

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

Committee Meeting.

A MEETING of the Committee was held on Tuesday, the 19th inst., when there were present:—Mr. R. W. Wallace, K.C., in the Chair, Mr. Griffith Brewer, Mr. Ernest C. Bucknall, Mr. G. B. Cockburn, Prof. A. K. Huntington, Mr. J. T. C. Moore-Brabazon, Mr. Mervyn O'Gorman, Mr. C. F. Pollock, Sir Charles D. Rose, Bart, M.P., and Harold E. Perrin, Secretary.

New Members.—The following new members were elected:—Lieut. Spencer D. Grey, R.N., Lieut. C. G. W. Head, R.N., and Engineer Commander Gilbert Howard Page, R.N.

Gordon-Bennett Aviation Cup.

The cup having been won by a representative of the Aero Club of America, the race for 1912 will take place in the United States. The exact time and place will be announced later.

At the recent Conference of the *Fédération Aéronautique Internationale* in Rome, it was decided that the course is to be a closed circuit with a minimum of 5 kilometres, and the total distance to be flown is 200 kilometres.

Each club affiliated to the *Fédération Aéronautique Internationale* has the right to challenge the holder, the Aero Club of America, and such challenge must be sent in before March 1st, 1912.

The Committee of the Royal Aero Club will select the three competitors to represent the British Empire, and intending candidates are requested to notify the Secretary on or before February 15th, 1912, of their willingness to compete, if chosen. Applications must be accompanied by a cheque for £20, the entry fee, which amount will be returned should the entrant not be selected.

Gordon-Bennett Balloon Race.

The cup having been won by a representative of the German Aero Club, the race for 1912 will take place in Germany. The exact time and place will be announced later.

Each club affiliated to the *Fédération Aéronautique Internationale*



The British Army Aeroplanes.

IN reply to a question in the House of Commons by Mr. Joynson-Hicks as to how many of the twelve effective aeroplanes owned by the British Government could fly 60 miles an hour without the aid of a following wind, and how many were of the old box-like pattern, Col. Seely said the answer to the first part of the question was two, and to the second none.

has the right to challenge the holder, the German Aero Club, and such challenge must be sent in before February 1st, 1912.

The Committee of the Royal Aero Club will select the three competitors to represent the British Empire, and intending candidates are requested to notify the Secretary on or before January 15th, 1912, of their willingness to compete, if chosen. Applications must be accompanied by a cheque for £20, the entry fee, which amount will be returned should the entrant not be selected.

Annual Dinner.

The annual dinner was held at the Royal Automobile Club, on Thursday, December 14th last, and was attended by about 300 members and guests. After the speeches, Mr. Manville presented Mr. C. H. Pixton with a cheque for £500, being the prize won by him on an all-British machine, with passenger, for the longest aggregate time in the air on nine specified days. In the unavoidable absence of Mr. André Michelin, Mr. Marc J. Wolff, on behalf of the Michelin Tyre Co., presented to Mr. S. F. Cody cheques for £400 and £500, respectively, being prizes won by him on his all-British Cody biplane.

During the evening an excellent musical programme was carried out by Miss Marian Jay, Signor G. Lenghi, Senorita Carmen Turia, Mr. E. H. Mills, Mrs. Lilian Mackenzie-Fairfax, the Imperial Russian Trio, Miss Madge Temple, Signor Francia, Mr. James Chilcott, and Miss Ellen Tuckfield.

Lantern Slides.

Mr. C. G. Grey, Editor of *The Aeroplane*, has kindly presented the Club with a set of lantern slides dealing with all the latest types of machines.

Christmas Holidays.

Owing to the Christmas Holidays, the Club will be closed from Saturday, December 23rd, until Wednesday, December 27th.

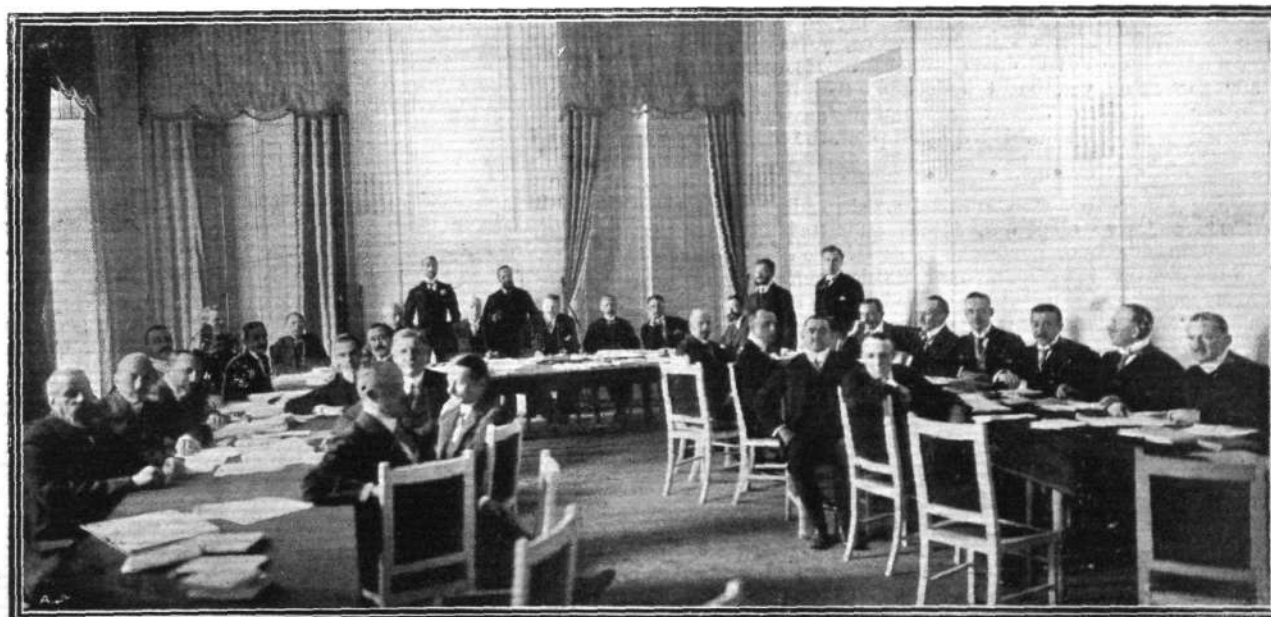
HAROLD E. PERRIN,
Secretary.

166, Piccadilly.



The Open Door in Australia.

SOME changes have recently been made in the Customs Tariff of the Australian Commonwealth, and among the few things which benefit are aeroplanes, which, whether of British or foreign construction, are now admitted free, whereas foreign machines used to have to pay 35 per cent. *ad valorem*, and British machines 30 per cent. *ad valorem*.



F.A.I. CONFERENCE AT ROME.—The delegates in Committee, presided over by the Chairman of the Royal Aero Club, Mr. Roger W. Wallace, K.C.

ROYAL AERO CLUB ANNUAL DINNER.

SUCCESSFUL as last year's annual dinner of the Royal Aero Club was, this charming function for 1911, which was held on Thursday of last week in the great gallery of the Royal Automobile Club, surpassed it in every way. Without being unduly crowded, the banqueting room was as full as it could hold. An excellent dinner awaited the guests, following a reception by the Chairman, Mr. Roger W. Wallace, K.C., in the special and elaborate erection which had been put over the terrace of the R.A.C. in connection with the big Durbar Ball held at the Club on the previous Tuesday.

After the excellent repast had been discussed and the loyal toasts duly honoured, the Chairman called upon Mr. G. J. Sandys, M.P., to propose the toast of the "The Imperial Forcer."

Mr. Sandys confessed that he could not understand the attitude of our authorities towards military aviation. From personal observation at the French military manoeuvres he could vouch that, from what he saw, there was not the smallest exaggeration in the reports as to the value attached to the fourth arm by the French authorities. It was evident that the future for it was very great. Had the fourth arm been available twelve years ago most of the disasters of the South African campaign would have been either avoided or greatly modified. The French Government were, in spite of their great advance at present, prepared to lay down enormous sums in the furtherance of the science in the coming year. Comparing this with the British War Office our position was most unsatisfactory. The serious position was that in the event of war our leaders had no experience in, or the slightest knowledge of, the use of aeroplanes. The whole situation under such condition required radical alteration. The present proposals were for a short course of training for a hundred military aviators, and for them then to return to their ordinary duties. This was an entirely unsound and unsatisfactory proposition. A proportion of permanently engaged officers devoting their energies entirely to aviation was the only possible solution of efficient equipment for the Army for serious work.

Lieut.-Col. C. O. Smeaton, R.A., speaking for himself and his brother pilots, said he could safely say if the Government would supply the money and the material they would find the men. When the Morocco trouble arose, one of the greatest factors in preserving peace, on the top of the British Navy, was the strength of the French aerial fleet, which, by the demonstration of their practical worth under war conditions, scared to death those who saw what it was possible to bring immediately against the German army, and a further direct result was seen in the action of Prince Henry of Prussia in forcing forward huge expenditure upon aeroplanes for the German army.

Mr. W. Joynson-Hicks, M.P., in proposing "The Royal Aero Club of the United Kingdom," congratulated the Club upon the huge success which they had achieved in their work. Seven years ago they numbered 240 and now their numbers were well up to 1,400.

Mr. Roger W. Wallace replied and gave some quaint recollections of aviation and referred particularly to the chief aviation events of the past year, especially including the *Daily Mail* Circuit of Britain and the Gordon-Bennett Race at the Royal Aero Club Eastchurch flying grounds.

During the evening the presentation of prizes took place, Mr. C. H. Pixton receiving the Manville £500 prize, and Mr. S. F. Cody the British Empire Michelin Trophy No. 1, and cash prize of £500, and the British Empire Michelin Trophy No. 2, with a cash prize of £400.

Between the orations, and until a somewhat late hour, an exceptionally fine entertainment of a varied character was enjoyed, the artistes including Senorita Carman Turia, Signor Francia, Signor G. Lenchi, Mr. L. H. Mills, Miss Madge Temple, Miss Marian Jay, Mrs. Lilian McKenzie-Fairfax, Mr. James Chilcott, the Imperial Russian Trio, &c.

Over 300 members and guests were present, and amongst those who supported the chairman were:—Admiral of the Fleet, the Rt. Hon. Sir E. H. Seymour, P.C., G.C.B., &c., Sir C. D. Rose, Bart., M.P., Sir Norman Lockyer, Baron Campbell von Laurentz, Messrs. E. Manville, G. J. Sandys, M.P., W. Joynson-Hicks, M.P., Capt. the Hon. Edward Dawson, R.N., Lieut.-Col. C. O. Smeaton, R.A., Capt. B. D. Corbet, the Hon. Mrs. Assheton-Harbord, Lady Blood, Lady Lambart, Major F. M. Carleton, Capt. E. F. Sartorius, Lieut. B. H. Barrington-Kennett, Lieut.-Col. A. R. Hoskins, Prof. A. K. Huntington, Mr. Mervyn O'Gorman, the Hon. Mrs. Leveson-Gower, Countess von Resetas, Baron and Baroness H. de Ville, Mr. F. Hedges-Butler, Capt. P. Brooke-Smith, R.E., Mr. Alec Ogilvie, Capt. E. M. Maitland, Lieut. A. G. Fox, R.E., Capt. A. H. W. Grubb, D.S.O., R.E., Lieut.-Col. F. C. Trollope, Lieut. J. C. Porte, R.N., Dr. W. J. S. Lockyer, Messrs. F. A. Hirst (Yorkshire Aero Club), J. Wilkinson (East Riding Aero Club), F. E. McClean, J. T. C. Moore-Brabazon, S. F. Cody, Fred May, J. W. Dunne, H. Barber, O. C. Morison, James Radley, D. Lawrence-Santoni, D. Graham Gilmour, Capt. J. Bennett-Stanford, Messrs. R. Blackburn, L. Howard-Flanders, N. Chereau, Howard T. Wright, A. V. Roe, Kennedy Jones, F. W. Shorland, and Harold E. Perrin (secretary).

AIR EDDIES.

COMPTON PATERSON and E. F. Driver have, as anticipated, opened their tour in South Africa in fine style, and during the past week they have been making flights in the neighbourhood of Cape Town practically daily. On Monday, Driver, who knows the country well, was flying for three-quarters of an hour on his Blériot over the suburbs of Cape Town.

I hear that the Gnome people are experimenting with an absolutely new type of engine. It is a stationary motor, water-cooled, and with the cylinders set parallel to the crank-shaft. It is very difficult to get any particulars yet, but I understand that there are two pistons in each cylinder. The experimental engine which is now being tested is said to have developed 140-h.p. on the brake.

After noting that General Roques had decided to adopt the word "Avion" for military aeroplanes, I was interested to see that Mr. Montagu, in a reply to a question in the House of Commons, referred to the fact that instruction in practical "aeroplanism" of Indian Army officers was under the consideration of the Indian Government. "Aeroplanism" is a good word, but if the Government is going in for coining terms now that it has turned a somewhat more favourable eye on aviation, it is to be hoped that they will submit its proposals to Prof. Skeat, or some other competent philological authority first.

One regrettable result of the Naval Airship catastrophe is that the "Hermione" has been ordered to return to Portsmouth, and consequently Commander Schwann has had to interrupt the series of experiments with his Avro-hydro-aeroplane. Quite a lot of interesting data regarding this type of machine and its use have been obtained by Commander Schwann, and he has now a new pair of floats ready for testing as soon as a convenient opportunity occurs.

The Avro Flying School has cause to be pleased with the result of their past season's work, as, reviewing the list of prizes won a Brooklands this year, Mr. Roe tells me that 80 per cent. of them were carried off by Avro pupils or pilots who have graduated in this school. I hear that a limited company is being formed next year to take it over, when it should do even better, as in the past it has been run more as a testing department than a flying school. Messrs. A. V. Roe will now devote their time solely to the making of aeroplanes, and their works in Manchester are being enlarged to enable them to cope with the work in hand. By the way, the firm are making an attractive offer to those who wish to qualify for the Royal Aero Club superior certificate. Write them for particulars.

Evidently our cousins of the Australian Commonwealth are determined to get a move on in the matter of Army aviation. Evidence of this was afforded by the advertisements which have been appearing in the home and Australian papers calling for two competent pilots to act as instructors at an Army School of aviation which is to be commenced.

Capt. Fulton, I hear, is likely to be in charge of the military Deperdussin monoplane which has been acquired by the British War Office.

George Dyott and Captain Patrick Hamilton have been doing great things in Mexico, and the former had the honour on the last day of November of taking Francisco I. Madero, the newly installed President of the Mexican Republic for a ten minutes flight in his Deperdussin monoplane. A day or two previously he took Gaona, a popular bull-fighter, for a trip. During the flying week held in connection with the Presidential installation during the previous week Miss Matilde Moisant and Miss Harriet Quimby were out on their Moisant monoplane over the Valbuena flying ground nearly every day, and on one occasion they were both aloft at one time.

"OISEAU BLEU."

FROM THE BRITISH FLYING GROUNDS.

Royal Aero Club Flying Ground, Eastchurch.

ON Thursday last week Lieut. Gregory had his first experience of piloting the Short twin biplane, making a fine flight, and coming down full of praise for the new machine.

Saturday was an excellent flying day, and no time was wasted by the Eastchurch aviators. Travers was out early on the Short 70-h.p. machine, making a very pretty flight against a clear blue sky. Afterwards he made several tuition flights with Mr. Cutler and Mr. D. W. Barton, of the Territorial Balloon Section, both of whom took charge of the machine several times through the dual control. Mr. S. P. Cockerell, of the Territorials, also made a flight, lasting about 20 minutes, on this machine. In the afternoon Ogilvie was out on the N.E.C.-engined Wright biplane, flying with his skill and precision, at times skimming the whole length of the aerodrome within two feet of the ground.

Other pilots flying during the afternoon were Lieut. Samson and Lieut. Longmore, who put in some flights on the Gnome-engined Blériot, which has shown considerable improvement in speed since being fitted with a new propeller, and Lieut. Gregory and Captain Gerrard who were piloting both the single and twin-engine biplanes.

A new aneroid, specially designed for aviation purposes by Messrs. Short Brothers, has been tried on the twin-engine machine with great success. The aneroid, which only weighs ten ounces, has an exceptionally clear dial, marked to 7,000 ft., each thousand feet being indicated by the index figure only, which is in consequence of very large and clear type. A revolving scale adjustable by a thumb-screw enables the aneroid to be set at zero before starting so that the actual altitude above the ground is registered. The index finger is coloured red at the point, making it show very distinctly against the engraved lettering of the dial, and instead of the usual method of dividing the scale each hundred feet is indicated by a numeral, so that there is no need to count the spaces in reading the altitude, a point which is much appreciated by the pilots who have tried the instrument. Other useful features are an adjustable pointer, to mark the maximum altitude and to show readily whether whether the aeroplane is ascending or descending, and a special thin case taking up very little room. The aneroid is being made with $3\frac{1}{2}$ in. and $4\frac{1}{2}$ in. dials, reading to 5,000, 7,000 or 10,000 ft.

Brighton-Shoreham Aerodrome.

THE Chanter school is making headway here, Miss Preston, an American lady, having signed on as a pupil, and Mr. Mellersh, a Bristol pilot, is also joining. On Sunday, De Villers was out on the Blériot but was content with rolling practice.

The Collyer-England biplane will be out on the first fine day, as her engine is now reinstalled.

We have lost the Deperdussin as, we believe, she has found a purchaser. One of the British-built machines is expected here shortly, however, so the gap will soon be filled.

Brooklands Aerodrome.

WEDNESDAY last week was far too bad for any flying to be done, owing to high wind and torrential rain. On Thursday Sippe started out for his *brevet*, but decided to come down owing to the unfavourable conditions. The Spencer and Bristol machines were also out for a short while.

There was no flying on Friday, whilst on Saturday nothing was out except the Green-Avro undergoing tests after its repairs, the Martin-Handasyde with Gilmour up, and the Bristol. The "Oozley Bird," piloted as usual by Percival, made a reappearance after its long seclusion. The pilot apparently found the warp rather strange, but made several straight flights.

On Sunday it poured with rain all day.

On Monday morning Raynham took the Green-Avro for straight flights, being the only one out.

Tuesday was slightly better as regards weather, but the wind did not drop at any time. Raynham took up the Viale-Avro for circuits, showing great steadiness. The Blackburn monoplane made its maiden appearance since being down here. Hucks, who was piloting, ran the machine down the ground, climbed a little, and pancaked slightly. Turning round to come back again, this time against the wind, he made the machine climb with the tail abnormally low. Then he pancaked again, and left several struts from wheel-base behind. Machine fortunately did not collapse, but was pushed back to the shed. The Walton-Edwards did straights, while the Deperdussin school machine was out rolling. Kemp did straights on the Vickers, which, by the way, has not been out for some time, owing to engine trouble.

Bristol School.—Owing to the defects in the Byfleet telephone service, we were unable to publish last week's doings. Needless to say, great progress has been made as usual, and this seems a suitable

occasion to remark upon the success of this school during the last few months. No fewer than eight pupils have obtained their *brevets* since September, namely, Major Benwell, Capt. Richey, and Capt. Harrison (all of the Indian Army), Capt. Allan (of the Welsh Regiment), Lieuts. Harford and Wyness-Stuart (of the R.F.A.), Capt. Gordon (of the Royal Marines), and Mr. Brereton. Pupils now undergoing tuition here number eight, namely, Capt. Weeding (of the Queen's Regiment), Capt. Raleigh (of the Essex Regiment), Lieut. Longcroft (of the Welsh Regiment), Lieut. Stephen-Smith (of the Special Reserve), Messrs. Nesham, Garne, Lane, and Warren. This speaks well for the work done by Fleming and Pizey, and the thoroughness of the tuition they give. The latter, by the way, is now at Salisbury Plain, putting in practice on the Bristol monoplane.

On Thursday morning Fleming was up with Capt. Weeding, who also held the lever. Then later with Garne, giving practice in figures of eight. Garne then passed the first half of his certificate, flying very well indeed, and landing from 100 ft. with engine cut completely off. Fleming, too, later was up with Capt. Raleigh, who subsequently did short straights by himself. Capt. Weeding then did "hops," after being passenger with his instructor. Longcroft made some straight flights with good landings. In the afternoon Fleming flew two circuits in a gusty wind and decided that it was too bad for pupil's work.

On Saturday Garne set out to pass the second half of his *brevet* but was unable to reach the necessary altitude. Thinking this was due to the machine Garne handed it over to Fleming who promptly took it up to over 600 ft. in half a circuit, thus dispelling any doubts as to the machine's efficiency. Garne, however, decided to try later. Captains Weeding and Raleigh, also Lieut. Longcroft, then did straight flights.

On Tuesday Fleming made his usual preliminary couple of circuits, then took up Lane as passenger. Capt. Weeding, meanwhile, was out rolling on the other machine.

Fleming, by the way, wishes it to be known that he intends to close the school from the evening of the 21st until the morning of the 28th.

Brooklands, it seems, will be very quiet just about Christmas, for, besides those who are joining their families, quite a number are going over to the Paris Show.

London Aerodrome, Collindale Avenue, Hendon.

Blériot School.—Brière was doing useful rolling practice on Monday last week, and then started to turn too shortly, managing thereby to break his propeller and do some slight damage to other parts of machine.

On Friday Morris got in a straight flight, and landing on the edge of the ground broke both wings, also damaging the chassis somewhat.

Sacchi, on Thursday, when making a too short right turn, fell rather heavily on his side and broke both wings, propeller, and minor parts. Machines will all be in commission again in the course of a few days.

Valkyrie School.—During the past week weather conditions have been consistently atrocious. Indeed, only on Thursday morning was any flying possible. Even then there was a gusty breeze blowing of 10 to 15 m.p.h., but this did not deter Captain Loraine from going out on the Valkyrie racer. He put up a fine flight of fifteen minutes duration, finding the air at the railway end particularly tricky, but he handled his machine beautifully, and successfully negotiated the corner again and again. A pretty *vol plané* terminated the flight, and then the wind blew with increased violence.

Salisbury Plain.

Air Battalion.—On Wednesday of last week the weather was very unpleasant, but in spite of it Barrington Kennett made one or two good flights upon his Nieuport monoplane, one lasting for twenty minutes. He was out again on the following day both with his Nieuport and also the Bristol biplane, his flight on the latter ending with a fine spiral *vol plané*. Capt. Fulton was also out on his biplane and made one or two trips by way of testing the weather conditions before Lieut. Fox, a new pilot, ventured up to make a trip round the camps. Barrington Kennett took up Lieut. Manisty for an excursion round the Farge and Netin Downs, and Lieut. Manisty afterwards went for a solo trip. All the other pilots were engaged in the hangars, overhauling and tuning-up machines and engines. Lieut. Reynolds has been taking lessons on the Bristol single-seater monoplane, and on Saturday he twice flew at a fair height round Farge, Rolleston, and Larkhill Camp. On Tuesday, Lieut. Conner was out testing a biplane.

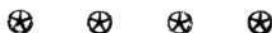
Bristol School.—Jullerot started the day's work on Tuesday, last

week, by taking up Lieut. Ashton, afterwards carrying Lieut. Brodigan. Pizey took Bendall, and afterwards did his first solo on the single-seater monoplane, performing two circuits, and landing remarkably well. In the afternoon, Jullerot made a trial solo, then took up Lieut. Ashton. Pizey had with him Bendall, and Mr. Sutton went up with Hotchkiss. Pizey and Jullerot each did his second flight on the single-seater monoplane.

Jullerot made a trial on Wednesday, Lieut. Brodigan joining him afterwards. Busted carried Bendall and then made a solo on the single-seater monoplane, followed by Pizey on the same machine, he having meanwhile taken Lieut. Ashton. Lieut. Brodigan first and then Bendall went for a trip with Jullerot. Busted took Lieut.

Ashton, and Pizey carried Lieut. Brodigan and Bendall. Lieut. Porter made a three-quarters of an hour solo flight at the height of 1,000 ft. He is now quite ready for his ticket.

On Saturday Jullerot went up with Lieut. Brodigan for half-an-hour, and Busted, Pizey, and Lieut. Reynolds, R.E., each made a circuit on one of the school monoplanes. Bendall made his first circuit solos in good style, and Lieut. Head, R.N., also made two solos. Lieut. Ashton made his entrance into the solo-flying stage, acquitting himself very well. Lieut. Porter flew another two solos, thus making the fifth pupil in the solo stage at one time in the school. Busted and Jullerot each flew alone, and Pizey finished the day's work by taking Lieut. Brodigan.



FOREIGN AVIATION NEWS.

A British Aeroplane Over Paris.

To Mr. James Valentine belongs the proud distinction of having been the first Britisher to look down on Paris from an aeroplane. On Thursday of last week he started up from Issy on the Bristol two-seater monoplane, and circling the Eiffel Tower, crossed the Seine and the Place de la Concorde to Notre Dame. After circling the dome, he continued on to Vincennes, and afterwards flew back to Issy.

At the Maurice Farman School.

AT Buc, on the 12th inst., Maurice Farman carried Tellier for a long trip, and on the 14th Engineer Barbaroux, of the Delaunay Belleville firm, made a good cross-country flight on his M. Farman biplane. Lieut. Marnies was flying for an hour, during which he passed over Suippes, Chateaufort, while Lieut. Noe was practising high flying.

A Lady Flyer at Compeigne.

ON the 14th inst. Mdle. Jane Herveu paid a visit to the Martinet-Legagneux school at the Corbeaulieu flying ground, and was given flights by Legagneux both on a Blériot monoplane and also on the Farman biplane. In the evening Mdle. Herveu was taken both by Martinet and Legagneux for moonlight trips.

New Blériot Military Machines.

AT Etampes on the 14th inst., two Blériot machines of the new type No. XXI were put through their paces, and one was accepted by the French Government and the other by the Russian Army authorities. The latter ascended to a height of 1,050 metres in 15 minutes. The single-seater No. XI type offered by the *Petit Gironde* has arrived at the Blériot military school at Etampes, and in its trials rose 300 metres in 3 minutes and attained a speed of 98 kilometres.

New French Superior Pilots.

ON the 14th inst., at the Borel School at La Vidamée, Naval Lieut. Deve made his first flight for superior military certificate over a course from Senlis to Roy and back, and on Sunday Mahieu, on a Voisin biplane, made his second test, his time for the course from Issy to Etampes and back being 1 hr. 56 mins.

An Hour's Flight by Hanriot.

WHILE his father was giving passenger trips to M. and Mdme. Lantene on Sunday last, Marcel Hanriot was out and made a flight of an hour at a height of about 1,000 metres.

M. Paulhan To Have a Curtiss Hydro-Aeroplane.

FROM New York it is reported that Louis Paulhan has ordered one of the Curtiss hydro-aeroplanes to be delivered to him in January.

Fatal Accident to Lieut. Lantheaume.

MYSTERY enshrouds the accident by which Lieut. Lantheaume lost his life on the 13th inst., at Melun. He was an experienced pilot, having obtained his superior certificate, and at the time the weather seemed to be quite good for flying. After a practice flight at Etampes in the morning, he set out on his monoplane in company with three other pilots to fly to Melun, where his brother-in-law and two sisters were waiting. On arriving at his destination the lieutenant came down by a *vol plané* from a height of 500 metres, and when about 50 metres from the ground the machine seemed to tip up and drop like a stone, the pilot being buried beneath the débris. He was hurried to the hospital but died within a few hours.

A Mishap at Buc.

ALTHOUGH his mechanics advised him not to take his monoplane out as they could not get the engine to work properly Lieut.

Lussigny, at Buc, on the 12th inst., would not be denied. He started off and got to a height of 40 metres, although he found it very difficult to control the machine. Suddenly, however, another monoplane appeared and to avoid this Lieut. Lussigny made a turn to the right. His machine, however, side-slipped and fell with a crash, the pilot sustaining a broken arm and fractured ribs.

A Savary Test.

ON the 14th inst., Capt. Destouches and another officer attended at Chartres to witness trials of a Savary biplane before it was taken over by the Army authorities. Four tests were made for speed, duration, height, and *vol plané*, and in each Frantz, who was the pilot, made very good performances. For duration he was up an hour and a quarter, and flew over Chartres and round the clock tower of the cathedral.

A Swiss Prize Won.

WITH the object of encouraging the home industry, the Swiss Automobile Club offered a prize of £200 for the first Swiss aviator on a Swiss machine to cover a circuit of two kilometres before the end of the year. The prize has been practically won by Grandjean, who made some very satisfactory trials a day or so ago with a monoplane which he has built himself at Dubendorf, near Zurich.

Fine Cross-Country Flights in Bohemia.

VERY fine flights were made by Jean Kaspar and his cousin, Eugene Cihak, in Bohemia, on the 6th inst., the former accompanied by a friend, on his Blériot monoplane, going from Melux to Prague, where he landed on the Chuelle Racecourse, having covered the 70 kiloms. in 42 mins. 52 secs. Ten minutes after they started Cihak started off on a Morane monoplane and reached Chuelle five minutes after they landed. A lot of flying was seen on the 10th inst., when a regular demonstration was held and Kaspar took up a number of prominent people including several deputies.

Record Speed on a Curtiss Hydro-Aeroplane.

TESTING a new Curtiss hydro-aeroplane, fitted with a 75-h.p. engine at Hammondsport, N.Y., on the 13th inst., Mr. Hugh Robinson attained a speed of 74 miles an hour, which is claimed as a record for hydro-aeroplanes.



AIRSHIP NEWS.

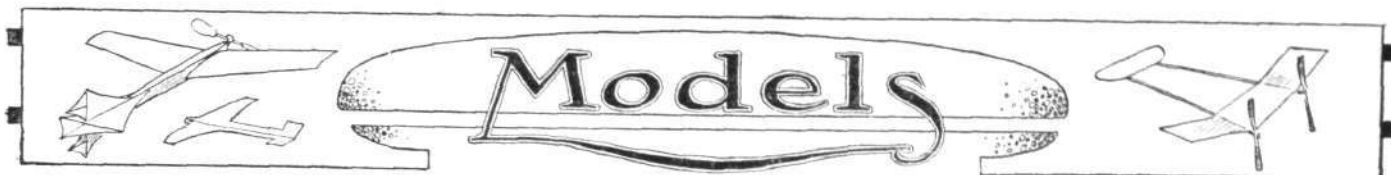
"Siemens Schuckert" goes to Gotha and Back.

ON the 15th inst. the German dirigible "Siemens Schuckert" made another appearance in the open. Leaving its hangar at Biesdorf at 8.27 with the advantage of a gentle south-west breeze it passed Wittenburg at 11.30, Bitterfeld at 12.7, Halle at 12.45, Weissenfels at 1.40, and Weimar at 2.45 and landed safely at Gotha at 3.40 p.m. On the following day it returned and made a much faster journey. Leaving Gotha at 8.15, Weimar was passed at 9, Bitterfeld at 11 and Biesdorf reached at 1.30.

"Parseval VI" Breaks a Propeller.

DURING a trip across Berlin on the 7th inst. one of the propellers of "Parseval VI" broke, and a landing was effected at Biesdorf. Some time was spent in an endeavour to effect repairs, but without success, and it was then decided to try and get the airship back to headquarters under its own power, using only one screw, this manoeuvre being successfully carried out.

A somewhat similar accident befel the dirigible on the 13th inst., when she was about 60 kilometres north of Berlin. In the fog the airship got off her course, and in affecting a landing, got mixed up with the trees, with dire results to one propeller. It was decided to spend the night where the landing was made, and on the following day the airship once more returned home by means of the remaining screw.



Conducted by V. E. JOHNSON, M.A.

Plan Forms of Supporting Surfaces.

IN considering this question, due regard must be paid to both longitudinal stability and constructional difficulties. For maximum efficiency in actual flight the main plane or aerofoil should have that shape and area which gives the maximum lift efficiency, that is, it should be a rectangle of high aspect-ratio—for the higher the aspect-ratio, the greater the efficiency—for the lift of an aerofoil (plane or curved) depends, other things being equal, on the length of its leading edge.

The only other plan forms worth considering are:—(a) the elongated ellipse, practically a rectangle with rounded-off corners; (b) the rectangle with chamfered rear edge. The writer has tried all three forms, and is compelled to admit that he prefers the simple rectangle. It may be worth noting that in the Wakefield Competition last July, the three prize-winners (two monoplanes and one biplane) had main planes of this form. The rounded ends of the elongated ellipse certainly give the model an appearance of "finish," when constructed of steel wire, and will no doubt be preferred by many model makers. The aspect-ratio used in actual practice will be found to vary from 4 to 1 up to 9 to 1. Personally we do not recommend a less aspect-ratio than 6 or 7 to 1. The difficulty of constructing models possessing a high aspect-ratio and yet possessing sufficient strength and lightness are the determining limiting factors.

Having thus fixed the plan form or shape of the main plane, we are now able to vary the shape and position of the "elevator" or "tail," i.e., the rider plane as it is often termed in such a manner as to produce a model possessing maximum automatic longitudinal stability. For stability the front plane or elevator must be set at a positive angle with respect to the back; and when the main plane is in front and the rider plane (a "tail" one in this case), then this latter must be set at a negative angle, and we have in both cases (supposing the machine properly designed), a restoring torque tending to right the machine, for in both cases there exists the necessary dihedral angle or vee (opening skywards) between the main supporting plane and the rider plane.

It is also quite easy to show theoretically that the rider planes should be placed at a maximum distance (within limits of course) from the main plane, so that the moment of inertia of the machine should be a minimum.

As to the plan forms of these rider planes, Mr. A. P. Thurston, in an article in *Engineering*, May 19th, 1911 (founding his conclusions on both theoretical and experimental data), states:—

A. With the rider plane in front, the rider should have a large aspect-ratio in "length aspect," and a long span approximating to that of the rear main plane.

B. With the rider plane behind, the rider should have a smaller aspect-ratio than the front plane, and should preferably be triangular with the apex toward the wind.

The adoption of the triangular-shaped tail plane apex forward appears to be quite general.

With respect to the elevator or front-rider plane, considerable difference of opinion exists. We have tried the form advocated by Mr. Thurston with but indifferent success—such a form appeared to have a very marked effect in slowing-up the model or in setting up a pitching motion—liable at any time to become excessive. The best flights that we have obtained, and also that we have seen, have been made with models which have very small elevators of moderate aspect-ratio. The plan form of the elevator is generally, but not always, similar to that of the main plane.

To calculate the area of an ellipse, measure the longest and shortest axes, and multiply their product by 0.7854.

Notes.

Several correspondents having written about difficulties they have met with in constructing self-rising models of the tractor-screw and main-plane-in-front type, we will give next week particulars and scale drawings of a very simple but successful model of this type.

Readers desirous of experimenting with self-rising models will find an article in the *Model Engineer*, of September 14th last, on this subject which may interest them.

Those who may be experimenting with engined models should not fail to notice Col. F. G. Stone's concluding remarks (p. 1087), in last week's issue, re "Something to Shoot At."

We were very pleased to see (Brighton and District Model Ae.C.) that a 21-oz. model had flown some 300 yards. Personally we would

like to see far more of this type of model about, and less of the fashionable four-ouncer, which has done so much to make the general public look upon model aeroplaning as a sport *only* fit for boys.

J. March (32, Woodstock Road, Oxford) writes to say that he is prepared to supply the correspondent who desires to build a Fleming-Williams model with plans, details, &c., for 6d. E. M. Lear also writes, enclosing cutting from *FLIGHT* (December 10th, 1910), which give particulars and dimensions of this model.

P. Harvey (54, Kensington Mansions) wishes to know if there is any likelihood of a model aeroplane club being formed in South Kensington.

We much regret that we should have interpreted Mr. C. Ian Burrell's signature as Russell, and inserted the photographs in December 9th issue, p. 1075, under that name. It is quite evident from Mr. Burrell's letter that, in stating the span to be excessive, he thinks we were judging from the photo alone, and not from the dimensions given in his original communication, as was really the case. In his first letter the span is given as 16 ins., and the length of the rubber motor as 20 ins. In his second letter the span is given as 15 ins. and total length 20 ins. Taking the latter we have a span three-quarters the total length, which for a rubber-driven model of the type shown we should certainly consider excessive. It is no unusual thing for the total length to be twice the span, or even more. Personally, we never make it more than two-thirds, as a matter of fact, always somewhat less than this.

In the photograph the span looks longer than the total length, and in this case, as Mr. Burrell says, "photography has lied." Now this raises a very interesting point in the photographing of models. The propeller-end of the model is obviously much nearer the lens (in proportion) than the other end and hence this exaggeration. The shorter the focus of the lens the worse the result. The best way to take a model is really to hang it up so that all its parts are (approximately) in the same vertical plane with respect to the lens. This may seem treating the model in an undignified manner. Another plan is to place the model on the ground and take it from above, making use of a table or a pair of steps for the purpose. In order to get all details sharp the lens should be well stopped down—personally we use F. 44. Obviously these remarks do not apply when taking a model in actual flight.

Replies in Brief.

GEORGE HEWETT.—It can be shown on theoretical grounds that under certain circumstances three planes are more stable than two. If your two planes did not form the vee referred to in our current article you would have instability, on introducing a third plane, making a positive angle with them then the necessary stability condition would be fulfilled. It is also quite possible that there was interference (of the wrong kind) with your original planes. The fact of them being either tandem monoplanes or biplanes would not affect the result.

E. T. SIMPSON.—Your query is practically answered in our present article. It is quite possible you would find your model fly better if fitted, in addition, with a small elevator set at a positive angle to the main plane, in which case your non-lifting tail can be set at the same angle as your main plane.

C. BENNETT.—You do not state the distance your tractor screw-monoplane flies—no good model capsizes in the air, even when flown as you say. Unless you can obtain a distance of 400 yards, or a duration of at least a minute, we should regard the placing of it on the market as a doubtful factor, also the model should rise in its own length if started off a strip of linoleum.

S. H. S. M.—We agree with you that the type of model you suggest is interesting, and we shall deal with it later on, when we will also make use of your previous communication.

L. S. LATHROP.—As to answer all the questions contained in your letter would—according to a careful calculation—take at least the whole of one *FLIGHT* page, we must respectfully decline, and refer you to the conditions printed on p. 1052 (December 2nd). N.B.—The number of the questions is only 38.

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"Aviation and the Aero Model."

ON Friday, the 15th inst., Mr. R. P. Grimmer gave a lecture to about 200 of the pupils at Highgate School on the above subject. His remarks were illustrated by over 100 slides, and Mr. R. F. Mann gave in-door demonstrations with miniature monoplanes not exceeding half an ounce in weight.

PROGRESS OF FLIGHT ABOUT THE COUNTRY.

NOTE.—Addresses, temporary or permanent, follow in each case the names of the clubs, where communications of our readers can be addressed direct to the Secretary. We would ask Club Secretaries in future to see that the notes regarding their Clubs reach the Editor of FLIGHT, 44, St. Martin's Lane, London, W.C., by first post Tuesday at latest.

Blackheath Aero Club (196, BROCKLEY ROAD, BROCKLEY, S.E.).

ON Saturday last many members indulged in a little practice at the Kidbrooke Aerodrome and a new tractor-screw model made its debut, and occasioned a great deal of surprise on account of the wonderful lateral and longitudinal stability possessed by this model, and its constructor, Mr. Rippon, is to be heartily congratulated.

The longest distance flown, about 140 yards, does not compare favourably with the long flights made by the twin-propeller models, but, nevertheless, it is exceedingly good for this type of machine, equipped as it was with a landing chassis and wheels.

The 2½ oz. Victor monoplane flown by Mr. Clark ascended to high altitudes, and it repeatedly flew out of the ground, but the best results obtained with this model were at Blackheath and Lee. At the former ground it covered the ¼-mile on several occasions, eventually flying a distance of 1,653 ft.; however, later on at the Lee Aerodrome it made a splendid flight of 2,265 ft., which is a record for the club.

Mr. L. Brough's hydro-monoplane was under test over one of the Blackheath ponds, and although the model was content with a "hop, skip and a jump," the information gained during the experiments should prove valuable, and numerous alterations will be made in the new "hydro" models now under construction.

Messrs. Hunt, Whitworth, and Scott were experimenting with "tractors," and Messrs. Brough, Pizey, Egelstaff, Dodd, and Trask made many excellent flights with the more popular type monoplanes, whilst a biplane made several beautiful ascents; this being the first biplane to appear at any B.Ae.C. meeting, the change was very much appreciated. To-day (Saturday) there will be impromptu competitions for "distance" and "point-to-point."

On Bank Holiday there will be a "duration" event, and another "point-to-point" contest, and flying will commence at 3 p.m. to-day (Saturday), and at 2 p.m. on the 26th inst.

In the "p.-to-p." contests competitors will have to fly their models to and from the three points of a triangle—total distance about 500 yards—and the member who returns to the starting point in the least number of flights will be declared the winner. The above competitions will be held at the Kidbrooke Ground, and the usual practice flying will take place at Blackheath and Lee.

The secretary (Mr. Clark) will present a rose-bowl to the constructor of the "tractor-screw" model (single and twin screws are eligible) which flies the greatest distance in one flight on any day during the Christmas holidays. The distance will be measured in a straight line from start to finishing point. The following new members were elected:—Mr. W. Drew, of Camberwell; Mr. C. B. Holland, of Brockley; and Mr. G. Vance, of New Cross.

Will members please endeavour to get their "Show" models ready for the Exhibition to be held at the Central Hall, Peckham, on January 4th, and if they will inform the secretary how many and the approximate size of the machines they propose to exhibit, it will greatly facilitate the necessary arrangements. The secretary will supply further particulars to anyone making written application to the above address.

Bootle and District Aero Club (late Liverpool Model Aero Club) (39, BROOK ROAD, BOOTLE).

At the general meeting held on the 13th inst., it was decided to change the name of the club as above, owing to the increasing number of members who reside in Bootle and district, and to the fact that more facilities from local people can be obtained by the change. First class certificates are to be issued as under:—

Practical.—1,000 ft. straight flight, 40 seconds duration. Both to be completed same day and observed by same person or persons.

Theoretical.—1. How does an aerofoil lift? Its action on the air? 2. Find the pitch of an 8 in. diameter propeller when the angle of the blade at the tip is 45 degrees. State working. 3. Explain what a propeller is. Its action and the difference between a true helix and an ordinary bent wood propeller. 4. Give reasons for supposed instability of a model aeroplane and how would you overcome same? 5. What is "torque"? What means would you employ to overcome same? 6. Explain the theory of your own latest model. 7. What is "camber"? State the theory of a cambered surface and why it is a better lifter than a flat plane. 8. What is a "remous"?

On Friday, 15th inst., the Hon. Sec. gave the first public lecture on aviation before a Bootle audience at the Town Hall, his subject being illustrated by a working model of his "Cathedral," fitted with landing chassis and controls, after the Farman type. The lecture was much appreciated, and several gentlemen promised to

interest their sons in flying. The model now reposes in the Bootle Museum permanent collection. The Librarian has asked the Hon. Sec. to prepare a list of aeronautical books suitable for the Library, so Bootle members will soon be able to learn a lot without expense.

The Brothers Malins have completed the fuselage of a full-sized glider notable for its solidity, strength, and lightness of construction.

Brighton and District Model Ae.C. (36, LITTLE PRESTON ST.).

A SPLENDID afternoon's flying was experienced at the Brighton-Shoreham Aerodrome on Saturday last. Members mustered strongly in spite of somewhat adverse weather conditions. The club's eight-year old member opened the proceedings with a 50 yard flight on a "Baby" model built by himself. Congratulations to little Sanderson. Bate, who turned up with about a dozen models of different sizes, began by sending one up to a tremendous height. Several times he covered over 300 yards. Von Wichmann, after tuning up competition model, did a 310 yard flight. Knowles also did well. White flew a strange little monoplane, reminding one of Lanchester gliders. Wiedmann nearly terrified some of the members by flying something which sounded like a 50-h.p. Gnome. Altogether too fast to see what it was. Burghope, as usual, flew his 21-ounce "bus," getting regular 250 yards spins. He also did over 300 yards with a very fast light model. The afternoon's sport wound up by a sonorous crash—without breaking anything—of a 21-ounce "bus." Flying to-day (Saturday, 23rd) at Shoreham. Also on Boxing Day. New-year members apply to Mr. A. von Wichmann, "Kingsleigh," Kingsway, Hove. The club has the finest flying ground in Home Counties. No trees at all.

Croydon and District Aero Club (129, HIGH STREET).

A COMPETITION will be held on Christmas Day on Mitcham Common at 11 o'clock. There will be three events, viz., height, distance, duration; an entrance fee of 3d. per model will be charged, and three attempts will be allowed.

The club are holding meetings every Saturday on the Common at 3 p.m., and the Secretary and members will be pleased to see any prospective members on these occasions. The subscription is 1s. per month or 3d. per week, which includes use of workshop. Join now, and have some models ready for the Spring competitions.

Dover and District Model Ae.C. (21, GODWYNE ROAD, DOVER).

A MODEL aero club was started on December 16th, when it was decided to hold the first general flying meeting to-day (Saturday), weather permitting. New members will be welcomed and anyone interested in model aeroplaning should communicate with the hon. secretary, D. Davis, as above. Model aeroplane makers are invited to send catalogues to the secretary.

Paddington & Districts Ae.C. (133, BUCHANAN Gdns., HARLES DEN).

FOLLOWING last week's announcement as to change of secretaryship, Mr. A. Hurlin, our late secretary, was unanimously elected to fill the post of competition superintendent, and the following gentlemen were elected to constitute the committee of management:—Messrs. Brooks, Canning, Carter, Weston, and Woolley, the secretary and competition superintendent being *ex-officio* members of the committee. Messrs. Brooks, Hurlin, Waller, and Weston have offered substantial prizes for models constructed in the club workshop: (1) For model rising under own power and flying greatest distance on last Saturday in April; (2) for the best long-distance flyer, points awarded for construction prior to awarding points for flight, on last Saturday in February; (3) for a duration model competition for same on last Saturday in May; (4) for the best scale model of any full-sized aeroplane, to be judged at end of March.

Four new members were elected at last week's committee meeting, which is promising for the close season, and augurs well for keen friendly encounters in the new year.

Owing to shortness of daylight and length of journey to flying ground at Parkside, Sudbury, little actual flying is being done, but the club do not intend to let members' interest wane during the winter, which is evinced by Mr. Hurlin's announcement to give a lecture (with demonstrations) to members early in January on "Constructional Details as applied to present-day Models." Results of committee meetings and other important notices are posted in the workshop every Thursday—members please note.

Putney & Wandsworth Flying Club (3, GROVE COTTAGES, S.W.).

THE gathering on Saturday last was not very well attended,

two members only having machines, but there was plenty to interest those without. Mr. Hall's model, as usual, was flying high, and with good duration, 50 sec. being reached on two or three occasions with 500 turns in the elastic, and ended with Mr. Hall's usual *vol planés*. Mr. Smith had a 3 ft. 3½-ounce model up with a modified Fleming-Williams plane, and a fin which seemed to keep the machine's right, but no great distances were obtained, owing to the propellers not being suited to the machine, and it is hoped when new ones are fitted that the quarter will be reached.

The duration of the club stands at 69 sec., made by Mr. F. Baggs with a 14 in. model. This club is not as yet in running order, but it is hoped in the new year to organise monthly competitions, if enough members are obtained. A gathering as usual on Barnes Common to-day (Saturday), when we hope all intending members will be present with models. This club is forming for youths of 16 and upwards.

Reigate, Redhill and District Aero Club (4, LONDON ROAD).

At a general meeting held on Thursday, December 14th, it was decided to hold the first flying meeting on Boxing Day at 2 o'clock on the club's flying ground, Earlswood Common. The committee hope that not only present members of the club will turn out with models, but also that non-members will attend. The committee are now on the lookout for a workshop, and are in hopes of securing premises near the flying ground. More members are wanted and the secretary will be pleased to give any information to intending members. After January 1st, 1912, the club hopes to hold weekly flying meetings and also a series of competitions.

Scottish Ae.S. (Model Aero Club) (6, McLELLAN ST., GOVAN).

ON Friday evening last week the members of the club and friends met in the Institute, Elmbank Crescent, where Mr. Riddock, the club's vice-president, delivered an excellent address on "Internal-Combustion Engines." During the evening Mr. Graham passed round for inspection parts of the model petrol-motor he is making, and Mr. Rankin brought a card model of a float-carburettor, which showed very clearly the working of this very important part of the engine. These two gentlemen also added a few remarks on valves and carburettors, respectively. As the subject of the petrol motor covers such a large field for discussion, it was decided to keep open several dates for further lectures on it. On Saturday the weather was very bad, and only a few turned up for practice at Ibrox. Notwithstanding the high wind and rain, Messrs. Ross and Graham made some excellent flights. Mr. Gordon had out a new machine, the main plane of which was enlarged to scale from a paper glider. After a few good flights, the model struck the palings on the outside of the ground, smashing up the new plane very completely. Several of the members also visited the Barrhead Aerodrome, but, owing to the adverse weather conditions, no flying was seen. By the kindness of the manager they were allowed to inspect the interior of the

hangar, and were much impressed by what they saw. It has been decided to visit Barrhead again on New Year's Day, and a big attendance is looked for. The next lecture will be given on January 12th, 1912, at 8 p.m. Further particulars will be given in **FLIGHT**.

There will be flying, as usual, at Ibrox to-day (Saturday), and also every Saturday until further notice.

Sheffield Model Aero Club (35, PENRHYN ROAD).

THE annual general meeting of the above club will be held on Friday, December 29th, at 8 o'clock p.m. prompt, at the Wentworth Café, Pinstone Street (opposite St. Paul's Church) when the report of the Club's doings during the past year will be read, also the balance sheet will be placed before the members. A circular-letter from the Kite and Model Aeroplane Association re affiliation will be read to those present. The Secretary will bring forward the certificates and subscription cards which have been proposed by the committee. The election of the following will take place for the ensuing year:—Hon. President, Hon. Vice-President, Hon. Treasurer, Hon. Secretary, Hon. Assistant Secretary and a committee of seven, besides the enrolling of new members. No member will be allowed to participate in any of the privileges or advantages of the club or be entitled to vote at the meeting whose subscription is in arrears. On the 23rd August the subscription was reduced to sixpence per month in view to increasing the membership. Those wishing to join the above will be welcomed at this meeting. The club hope to have a permanent field next year as an aerodrome.

Worcester Model Aero Club (VICTORIA INSTITUTE, WORCESTER).

A MEETING was held in the club room on Saturday, 16th inst., when it was resolved to appoint an assistant secretary, Mr. E. W. Harrison being elected for that office.

Several models were brought for inspection by the members. An animated discussion took place on "Fuselages" and "Types of Models," after which the secretary, Mr. Stanley A. Sears, gave a very interesting address on "Propellers and Elastic Motors."

The next meeting will be held on Boxing Day, on Pitchcroft Flying Ground, at 10 a.m.

The first of a series of competitions will take place on Saturday, January 6th, when a large turn-out of models is expected.

SCHOOL AERO CLUB.

Southgate County School Aero Club (84, BOWES ROAD, N.).

ON Friday and Monday evenings last members have shown great keenness by putting in plenty of work in the workshops. On both evenings several have stayed for a couple of hours after afternoon school, entirely oblivious of the fact that "tea-time" was becoming a thing of the past. Owing to the shortness of the daylight in the afternoons, the Friday flying meetings have been cancelled, with the result that the competition for the longest flight before end of term has had to be abandoned.

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CORRESPONDENCE.

. The name and address of the writer (not necessarily for publication) MUST in all cases accompany letters intended for insertion, or containing queries.

Correspondents communicating with regard to letters which have appeared in **FLIGHT**, would much facilitate ready reference by quoting the number of each letter.

The Military Aeroplane.

[1447] At the discussion before the Aeronautical Society on Monday, one important topic was, I believe, not referred to (and the multiplicity of speakers allowed me no opportunity of referring to it).

The question that I should like to see authoritatively answered is: "Are military aeroplanes likely to be used at night?"

There is much to be said both in favour and against such use, but a definite decision would have an important bearing on the design of future machines. Thus, if it be agreed that they will have to be used after dark, the question of whether they should carry a searchlight or luminous bombs has to be considered. Such machines need not be armoured (nor do I think it possible in any case for them to be efficiently protected), and probably it would be unnecessary to carry arms. On the other hand, if it be decided that their use by night is not likely to be of advantage, then secrecy is practically out of the question, since in daytime a machine in the sky must always be conspicuous. Then silencing the engines, a point on which much stress was laid, seems unnecessary.

There are many other points in this connection that could be discussed, which I hope will be duly considered by the authorities.

B. BADEN-POWELL, Major.

A Disclaimer from Capt. Fulton.

[1448] I see that in the December issue of *Aeronautics* I am credited with speaking at a lecture delivered at the Royal United Service Institute on November 15th. I was not present at that lecture, and the views which I am made to express are diametrically opposed to those I hold. I therefore venture to ask you for this opportunity of disclaiming them, and also the fact that I delivered an oration at all. The practical business of flying leaves me no time to get up lecture subjects, even were I able or inclined to do so.

Salisbury.

J. D. B. FULTON, Capt. R.F.A.

The Filey Disaster.

[1449] With reference to the regrettable Filey disaster, it appears to me that the sudden strain on the wings under such circumstances is under-estimated, even by Mr. Blackburn.

Considering the machine at the instant of flattening out, the attitude of the machine is suddenly changed from 65° (accepting Mr. H. C. Hunt's value) to a horizontal position.

Now the machine at this instant is still travelling in the same line of motion owing to its inertia. The initial effect of straightening out being to vary the inclination by an increase of 65° (in this case). The pressure on the planes momentarily becomes $P = RV^2 \sin \alpha (65^\circ)$, $= .006 \times 200^2 \times .906$ (approx.), $= 217$ lbs. per sq. ft., or something like 50 times the normal load. The total pressure on the wings at this instant becomes over 28 tons, and the corresponding stress twice

this amount (since the pressure is applied suddenly). It is hardly surprising that the planes should burst under such a stress.

This is assuming Mr. Blackburn's estimate of the speed just before flattening out to be correct.

Should, however, the resistances due to wings and body work have reduced the speed to 100 m.p.h., the stress still stands at 14 tons. Even if a machine flattens out suddenly when the descent is 30° at 60 m.p.h., the stress is about four times the normal load.

These calculations are based on the assumption that the machine is flattened out suddenly, and that at this instance the speed and consequently the inertia is great. If the elevator is depressed gradually, the direction will, of course, be a gradual curve, and the stresses set up in the wings, although large, will be nothing like the magnitude of the case considered above.

Newcastle-on-Tyne.

C. IAN BURRELL.

[1450] With reference to Mr. Blackburn's calculations *re* the Filey disaster in your issue of December 16th.

The speed of 207 m.p.h. would be correct for an aeroplane flying in a vacuum, but no allowance has been made for wind resistance, which is a very important factor. It is a fact that an iron shell—such as was fired from the old mortars—would never attain a velocity of very much more than 200 miles per hour, *however great the height* from which it might be dropped, owing to the fact that at about that velocity the wind resistance becomes about equal to gravity.

I believe it is fairly safe to say that the speed was never more than about 130 m.p.h.; and, though my calculation may be entirely inaccurate, I think it must be nearer the mark than that submitted by Mr. Blackburn.

Assuming a 60-h.p. engine, the tractive force at 65 m.p.h. must be about $\frac{60 \times 550 \text{ ft.-lb. sec.}}{95 \text{ f.s.}}$

(a) = 342, about.

The wind resistance at 65 m.p.h. per sq. foot is $65^2 \times .003$.

(b) = 12½ lbs., about.

From a and b the effective wind-resisting area must be about $\frac{342}{12\frac{1}{2}} =$

(c) = 27, about.

The maximum velocity must be when the total resistance equals the weight of the machine, or 1,350 lbs.

The maximum wind resistance per sq. ft. of effective areas at maximum velocity will then be $\frac{1350}{27} = 50$, about.

This accounts for a velocity of

$$V = \sqrt{\frac{r}{.003}} = \sqrt{\frac{50}{.003}} = \sqrt{17000} = 130, \text{ about.}$$

I am quite aware that my line of reasoning may be entirely wrong, but at the same time I think you will agree that 130 m.p.h. must be nearer the actual speed at the time of the accident. It would be interesting to hear the opinion of a mathematical expert upon the subject.

E. PARBURY.



The Bristol Monoplane in Paris.

THE only British machine on exhibition at the Grand Palais is the Bristol monoplane, and naturally President Fallières, on the opening day, paid a visit to the British and Colonial Aeroplane Co.'s stand, where, after admiring the machine, he accepted from Mr. Stanley White a magnificent album bound in vellum, and suitably decorated, containing views of the works and flying school of the Company. In view of Mr. Valentine's flight over the French capital on the British monoplane, the stand on which it is exhibited has proved a centre of attraction, while the design and construction of the machine have evoked favourable comments on all sides.



PUBLICATIONS RECEIVED.

The "Wellcome" Photographic Exposure Record and Diary, 1912. London: Burroughes, Wellcome, and Co.

A Compendium of Aviation and Aerostation. By Lieut.-Col. H. Hoernes. London: Charles Griffin and Co., Ltd. Price 2s. 6d. net.

"Le Triomphe de la Navigation Aérienne." By Count Henry de la Vaulx. Paris: J. Tallandier, 75, rue Darcau. Price, stitched, 12 frs.; bound, 16 frs.

Stability in Aviation. By G. H. Bryan, Sc.D., F.R.S. (Macmillan's Science Monographs.) London: Macmillan and Co., Ltd.

Catalogue.

Aeroplanes Henry and Maurice Farman. Farman Frères, 22, Avenue de la Grande-Armée, Paris.

IMPORTS AND EXPORTS, 1910-11.

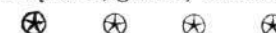
AEROPLANES, airships, balloons and parts thereof (not shown separately before 1910).

	Imports.		Exports.		Re-Exportation.	
	1910.	1911.	1910.	1911.	1910.	1911.
January...	£ 2,516	£ 1,196	£ 750	£ 1,688	£ 550	£ Nil
February...	437	3,129	2,950	1,786	—	—
March...	7,516	11,327	128	1,027	600	357
April...	6,305	2,110	950	807	1,470	4,343
May...	846	1,707	400	2,471	350	1,972
June...	7,961	3,225	642	2,432	558	1,682
July...	11,608	9,822	336	2,256	830	643
August...	6,188	2,873	812	2,153	1,455	265
September...	1,034	1,839	4,340	1,183	1,668	—
October...	2,816	4,727	670	701	2,211	400
November...	3,941	1,785	251	1,440	1,655	360
	51,168	43,740	12,229	17,344	11,347	10,022



NEW COMPANY REGISTERED.

Danners Accessories, Ltd.—Capital £1,000, in £1 shares. Manufacturers of aeroplanes, gliders, balloons, motors, &c.



Aeronautical Patents Published.

Applied for in 1910.

Published December 14th, 1911.

- 19,430. J. ANDERSON. Feathering wind-sails or propellers for airships.
27,282. J. G. NAVARRO. Aerial machines.

Published December 21st, 1911.

- 25,642. F. A. BARTON. Bombs for aerial purposes.
27,888. J. A. L. LANNES AND W. GOTTSCHALK. Aerial machine with safety device.

Applied for in 1911.

Published December 14th, 1911.

- 7,520. RHEINISCHE METALLWAAREN UND MASCHINENFABRIK. Starting device for flying machines.
18,866. E. A. IVATTS. Checking descent or fall of flying machines.

Published December 21st, 1911.

- 3,333. M. F. SUETER, F. L. M. BOOTHBY AND H. G. PATERSON. Launching devices.
8,434. M. GOEHLER. Propelling-vanes.
14,240. H. L. WILLOUGHBY. Aeronautical machines.
14,333. R. E. HEATH AND D. L. SHIEDER. Aeroplanes.
14,334. W. KIRCHNER. Balloon envelopes.
14,889. J. A., AND V. LOTZ. Automatic balancer.
17,863. R. WAGNER. Counter propellers.

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